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AIX-LA-CHAPELLE  
AS A HEALTH RESORT.

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# AIX-LA-CHAPELLE

(AACHEN)

## AS A HEALTH RESORT

BY

DRS. ALEXANDER, BEISSEL, BRANDIS,  
GOLDSTEIN, MAYER, RADEMAKER, SCHUMACHER  
AND THISSEN

OF AIX-LA-CHAPELLE.

THE ENGLISH EDITION

TRANSLATED WITH THE SANCTION OF THE CIVIC AUTHORITIES

BY

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## EDITOR'S PREFACE.

**T**HE present work owes its origin to the friendly association of some fellow workers, as well as to the invitation of the authorities of the municipal baths to collect the observations made on the thermæ of Aachen. No limitation has been placed on the views of the authors who have contributed the various sections. Indeed the description of the influence of the thermal waters of Aachen and of the methods in which they are used from so many different standpoints as those of clinical physicians, surgeons, electro-therapeutists, dermatologists and pathologists should be specially adapted to introduce to the unprejudiced reader the undisputed value of these thermal waters. Moreover, in relation to their etiology the therapeutics of certain forms of disease have undergone a distinct revolution especially in recent times. It may be not without interest to the entire profession to become acquainted with the results attained in such

cases by means of well authenticated methods of treatment. We wish also to give our respected colleagues a ready reference book containing everything worth knowing about Aachen and in the hope that it attains this end we publish it for their favourable judgement and good wishes.

BEISSEL.





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I.

GENERAL PART.



I.

HISTORY OF THE BATHS OF AACHEN

BY

J. THISSEN, M.D.







**T**HE history of the baths of Aachen in ancient times is the history of the town itself. Uncertain as is the origin of so many ancient towns, the date of the foundation of our city and its baths is enveloped in an impenetrable veil of tradition. At the same time enough light breaks through the darkness to enable us to assert that the springs were the cause of a very ancient settlement here and that they, together with the other wealth of water in the neighbourhood, have also given it its name.

The earliest inhabitants of Aachen were Kelts, who probably on account of the mists on the neighbouring heights descended into the valley and established themselves there.

Aachen up to the end of the last century (and even yet by some scholars) was written *Achen*; in the tenth century it was called *Ahha* which name comes no doubt from *A*, *Aa*, *Aha*, which simply signified 'water' both to the Kelts and Germans. Since our city is situated on three brooks it is likely that this unusual circumstance has given rise to the name, but it cannot be readily proved that the presence of warm water, the most striking feature of the place, had anything to do with it. Other forms of the name, occurring in the course of time, are partly the simple form of *Aquae*, partly the collective *Aquae* (*Aquis*) *Grani* finally localised under the corrupt nominative *Aquis Granum*. From *Aquae* is formed the Low German derivative *Akc*, *Aken*, and the High German *Ache*, *Achen*, *Aachen*. Formerly in Old High German it was written *Ahha*, and in Middle High German *Ache*. *Ahha*

means 'flowing water', but is not the simple translation of *Aqua*. In French Aachen is called *Ayx* or *Aix-la-Chapelle* from the Pfalz-kapelle. The name of Aachen in Roman times has not come down to us. It was probably called *Aquae* with the distinctive term *Grani*. In earlier times it was thought that *Granus* was a brother of *Nero* and that he had founded a colony. This, however, cannot be accepted as historical as *Nero* had no brother named *Granus* nor indeed any relation who could be called a brother. At the present time it is more generally believed that *Aquae Grani* meant nothing else than *Aquae Apollonis*. Wherever the Romans found a well it was dedicated to some divinity, or they retained the name of the stream-god of the native population. In Germany as elsewhere, *Apollo Granus* was a much honoured deity in Roman times. It is proved by ancient inscriptions that he stood in high repute as a dispenser of health and as a healer. The worship of *Apollo Granus* may have been introduced into Aachen by the Romans, or since the Kelts had already the wellgod *Granus* the Romans may have simply retained him as the divinity of the place.

This opinion finds support in the following verses of *Conrad Celtes* who was crowned laureate in the time of the Emperor *Friedrich IV.* He says:

*Fumat aquis calidis urbs ab Apolline dicta,  
Corpora quæ morbis tacta liquore lavant.*

Many other legends exist concerning the derivation of this word *Granus*, but it would take us too far from our purpose to discuss them here.

There is no doubt that the Kelts had previously used these springs as baths. Keltic remains have been found in many places in the neighbourhood and it is of special interest as regards the baths that several years ago during the excavation of a Roman bath evidences of Keltic workmanship were brought to light below the Roman masonry. These Keltic remains are now preserved in the *Suermondt Museum*. Roman relics have also been found here which coincide with the coming of the Roman Legions in *Cæsar's* time.

Our city is not, however, as rich in remains of Roman build-

ings as several other places in the Rhine Province, yet many interesting evidences of the former Roman occupation have been frequently found, as well as several Roman bricks with the stamp of the Sixth Legion which establishes the fact that it was stationed in this district between the years 70 and 160 D. But apart from these remains there is also the clearest proof of an important Roman settlement to be found in the Roman baths discovered in the twentieth year of the present century and again in the year 1877. About the end of 1870 when the bath of the "Königin von Ungarn" was being rebuilt and widened during the course of the excavations a complete Roman bath was found, of which part had to be covered in again, but a considerable portion still lies open in the underground passages of the present bath. — In 1822 on the occasion of the laying of the conduit to the Elisenbrunnen Roman masonry had been met with in the Edelstrasse and careful excavations were made in 1877. The results were described by Dr. B. Lersch of this city in his work "Die Ruinen des Römerbades zu Aachen. 1878". Several *piscinæ* were also found as well as the *Hypocaustum*<sup>1</sup>, the limits of which, here as in other places, shown by round and quadrangular pilasters, are still pretty well preserved. In the *piscinæ* several brick built steps can be recognised as well as the flues for heating. On the occasion referred to a considerable number of Roman ornaments, gems, &c., were found in a choked up flue which still runs in the direction of the existing "New bath". Moreover, in the last century the remains of Roman baths were brought to light, especially under the Hungarian Chapel and in another place near the Cathedral (Restaurant zur Maus) and it is evident from these discoveries that the Romans possessed an important fortress here and that in their usual manner they had enriched it in every possible way. This fortress occupied almost the same site as the subsequent

<sup>1</sup> The *piscina* called also, *Natatio*, *baptisterium*, *puteus*, &c. was a large swimming bath usually of cold water. The *hypocaustum* was an arrangement of flues under the floor of the *assa* or hot room in which a form of Turkish Bath was taken. *Trs.*



palace of Charlemagne. Whilst in other places such as Bonn, Neuss &c. the successors of the Romans were accustomed to build alongside the pre-existing Roman camps, in this instance the palace was built directly over the Roman work and for this reason the excavations and researches were rendered much more difficult. The position of the settlement on five great roads gave it very great strategical importance. These warm springs were naturally much sought after by the Romans who were addicted to ablutions and baths and the baths here were diligently used if only as a military bath.

During the laying of the conduit to the Elisenbrunnen several fragments of votive tablets were found, the inscriptions on which have been variously interpreted by scholars. We give the following example from Brambach's<sup>1</sup> work. He supplies the deficiencies as follows:

FORT//////////VL ///  
 TV //LL E · LOCI · CA  
 DDNIVS GAIVS  
 IIIIVIR · AVCV

FORTUNÆ ÆSCUL. ET TUTELE LOCI CANDIDINIUS GAIUS SEVIR AUGUSTALIS. Thus it appears that Candidinius Gaius was the first historical visitor to our springs; therefore his name is inscribed at the head of the tablets in the Elisenbrunnen. These tablets are usually dedicated to the memory of well known historical personages who visited these baths. Whether the destruction of the baths and similar places was the consequence of the fall of the Roman Empire is not known, but it may be supposed that such was the case. There are no historical records of this period, and from that time impenetrable darkness hangs over our town and its sulphurous springs. It is however probable that in 451 the town was demolished by the Huns under Attila; but the extent of the place at that time is unknown to us.

Nothing certain has come down to us from the Merovingian period concerning the baths. A Merovingian tomb which was

<sup>1</sup> Brambach, *Corpus inscriptionum Rhenanarum*, p. 137. No. 628.

discovered in front of the Königsthor is the sole relic we can positively attribute to that time. It is only from the eighth century that we have historical data with regard to Aachen. Some of the coins preserved in the Coin Museum in Paris bear the name of Pepin and the mark Aquis as the place of coinage. It is certain that Pepin spent the winter of 756 in Aachen and that a chapel existed at that time, probably a parish church and we can gather from these facts that even before the time of Charlemagne Aachen was a place of sojourn for the French kings.

Aachen is mentioned authentically as AQUIS GRANI for the first time in 756. Charlemagne, however, is justly regarded as the creator of this town and its baths. Many legends link themselves to the great Emperor of the Middle Ages not only with regard to the Palace and Palace Chapel built by him, but also on account of his having discovered and beautified the baths. It is therefore not to be wondered at that a later generation in gratitude for what he has done for Aachen should represent him in particular as the firstfounder of the town, for the meagre history of earlier times recedes into the darkest background in the presence of his good deeds. Charlemagne was accordingly regarded through the Middle Ages as the founder of the city and as the discoverer of its baths. A legend tells how Charlemagne lost his way in the thickets near the town. His horse happening to tread in the hot water was frightened. Charlemagne investigated the cause of his terror and in this way discovered the hot springs, he also resolved to build a residence here as well as a chapel to the honour of the Mother of God. The historian Eginhard says that Charlemagne had already stayed here during the first year of his reign. Angilbert, a friend of Charlemagne, in a poem gives a lively picture of Charlemagne's zeal for building and describes also the construction of the baths. "Here others are occupied in searching out the hot springs, they surround the baths, seething with their own force, with walls and fix the handsome seats on steps of marble".<sup>1</sup> It is histor-

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<sup>1</sup> Lersch, Geschichte des Bades Aachen, Aachen 1870.

ically true that Charlemagne was very fond of baths, especially warm ones. He bathed even in his old age and it was, very likely, in consequence of a chill after a warm bath in winter that he died of pleurisy. From Eginhardt's writings it is evident that a large basin existed here in which Charlemagne with his suite, often a hundred persons, used to bathe and amuse themselves in various ways in the water. Charlemagne probably made bathing possible in this basin by introducing cold water and perhaps he also took the trouble to cover the place with a roof. It may be remarked here that two Roman aqueducts conducted water to the bath from Burtscheid and Lousberg<sup>1</sup>. The bath of that time would therefore be little more than a large basin enclosed and roofed over on the site of the present Kaiserbad. Owing to their great natural heat the thermal waters of Aachen would take a long time to cool in the air and it is all the more probable that the Roman cold-water conduits already existing in the time of Charlemagne in the neighbourhood of the Kaiserbad were made use of for cooling the bath.

After the death of Charlemagne many gaps again occur in the history of our baths. The town is said to have been destroyed by the Normans in 881 and the baths probably suffered during the devastation. During this period and for several centuries later nothing definite can be said of the importance of the baths as a health resort. It is possible, however, that the Princes assembled for coronations and Imperial Diets made use of them and it is certain that the Emperor Heinrich IV bathed here in 1064.

The hot springs appear to have been of special value to the inhabitants during the rise of the woollen industry at the close of the twelfth century as they proved very suitable for washing wool and cloth.

During the construction of the first ramparts in 1171 a second important spring, the "Rosenquelle" in the present Comphausbad-strasse, was met with; this well lay immediately outside the new

<sup>1</sup> Quite lately a portion of the aquaduct was discovered and laid bare in the Burtscheid district. Many of the tiles bore the stamp of the Sixth Legion.

city walls. Aachen was thus enriched by another very important supply of hot sulphurous water.

Our baths now consisted of two groups of springs which differed but slightly in their temperature and chemical composition; the oldest, the Upper Spring or Königsbad and the other subsequently called the Rosenquelle or Lower Spring was at that time outside the fortifications, but a century later when the new outer walls were built, it lay inside these but immediately outside the inner ramparts. The Rosenquelle at the time of which we are now speaking was certainly not used as a bath. The water was then used only for the felting of cloth as the still existing name Komphaus, the equivalent of Feltinghouse indicates. There is, however, no precise mention of the Lower Baths during this period.

The condition of the baths at this time is described by Guntherus Ligurinus 1223 in a poem on the deeds of the Emperor Friedrich I. We take the translation of this lively description of our baths from the "Aachener Lieder Chronik" of Alfred von Reumont, Aachen 1873.

Roaming through the Ardenne the King now reaches the valley  
 Called in the ancient days as now by the name of Aachen.  
 He who would seek its meaning and know why the name was given  
 Contented must rest with the little I myself have learned.  
 In the dark bosom of earth the secret channels lie hidden,  
 Where streaming from silent depths, from various sources mingled,  
 Laden with living sulphur the waters rush to the daylight,  
 Here boiling with wavering steam, there falling in mist on the wellside.  
 Led through vaulted canals and gathered in handsome basins  
 Where for the Royal bath the waters are suitably mingled.  
 Built by skilful hands in the long vanished ages  
 Marble steps all round make easy the path of the bathers  
 Who to their needs or likings taking the proper measure  
 Of warm water or cold, their bath here pleasantly temper.  
 How nature labours below with hidden might in the darkness  
 And what is the work of man, these things would ye know ye must learn  
 Of those who have made their homes in this place from the days of childhood  
 Who have received the truth of these secret things from their fathers.

From that time doubtless the baths have been a possession of the Crown. In the beginning of the thirteenth century the



Imperial Minister Wilhelm von Aachen, called The Bavarian, held the baths as a fief (*feodem balneorum intra muros civitatis Aquensis constitutorum cum suis appendicis*). On account of the sale of the baths to the religious house of the Marians, he surrendered the fief to Heinrich VII. who now (1226) bestowed it in perpetuity on the community.

A certain tax was levied on all the householders (in the documents, *laribus*) of Aachen for the maintenance of the baths. On the Marians taking possession Wilhelm The Bavarian appears to have further collected this impost. "He held the collection of this tax from the Cathedral Chapter as a fief."

Having suffered considerable loss by the great conflagration of 1236 the community were obliged in the year 1240 to lease the Königsbad at a yearly rent of 13 Marks. The leaseholders (. . . . *balneatoribus Wilhelmo et Gerado*) took over the responsibility of always maintaining everything appertaining to the baths as well as the buildings in good condition. At the same time nothing is known as to the nature of these buildings and other property.

The Interregnum was also a sad time for Aachen. Apart from the evil anarchical condition of affairs that prevailed everywhere the town had to withstand a siege by King William of Holland (1248). The great wealth of water of the town was availed of by the besiegers by means of dams in order to submerge it. The citizens apparently led off the floods by means of a canal, but nevertheless the place had to surrender after a blockade of six months. The Frieslanders who distinguished themselves during the siege were accorded by William the right of bathing in Aachen free of charge.

About twenty years after this the baths became the property of the city which first bought up the above mentioned bath tax of Wilhelm the Bavarian, the Marians renounced their rights in favour of the city and this was confirmed by King Richard of Cornwallis on October 8th. 1267. Since that time the city has remained the possessor of the Königsbad.

Close to the Königsbad and supplied from the same source the so called Kleinbad arose about this time, but of this building as well as of the erection lying to the west of the Königsbad and known as the Quirinusbad and supplied from an independant source, nothing certain is known. Another serious conflagration in 1333 was very prejudicial to the progress of the baths, but they were much more injured by the Black Death or The Plague which raged in Aachen in the middle of the fourteenth century. The terrible ravages which this disease made in all directions acted most injuriously on the baths and consequently on the "Bathcure". The rage for dancing which occurred a few years later also implanted itself in Aachen. The dancers who in the most wanton and immoral manner performed their antics in the presence of everyone around the altar of the cathedral itself, came to Aachen from the Netherlands and by their fury caused people to think they were possessed by the devil. Several exorcisements took place and the devil was once seen in the Königsbad so that it was closed for a long time (until the end of the fourteenth century).

The succeeding period brings us little worth noticing about Aachen except that from time to time princely personages made use of the baths.

The first authentic journey from a distance to the baths of Aachen was made in 1486 by the Burgomaster of Würzburg, Hans Thurmer by name. In 1520 Albrecht Durer stayed here during the coronation of Charles V. According to his diary he bathed three times and drank the waters with the "company" "Gesellen". It was then the custom in the baths to drink and have music. One of Albrecht Durer's touching pictures (which formerly was erroneously supposed to represent the present baths) shows us a "bath company" who passed the time in the baths drinking and who for their greater amusement had musicians to play to them.

About the middle of the sixteenth century journeys to the baths came more and more into usage. In 1559 the Cologne jurist Hermann von Weinsberg bathed here "in the Krinsbat

(Quirinusbad,) Cornelisbat and Koninkbad"<sup>1</sup>. The last was called the Kaisersbad from the end of the sixteenth century. The springs of Aachen gradually became more and more known in neighbouring countries and attracted foreigners to them. Writings also appeared which described the state of the baths; for instance in 1564 Fabricius wrote a detailed account of them and of their restoration in the sixteenth century. Many editions of this work were printed, from which it appears to have enjoyed a wide circulation. The prosperity of the baths was again impaired on account of the religious disturbances and the frequent recurrence of the plague.

They were again flourishing in the seventeenth century. Detailed, though for the most part incomplete accounts of the springs of Aachen appeared about that time. Besides these we have also a valuable Chronicle by Noppius in 1632 which gives a further account of the baths. At that time the municipality owned the Kaisersbad, the Kleinbad (since called the Königin von Ungarn,) the Quirinusbad (situated behind the Kaisersbad) and the Armenbad (Comphausbad) supplied by the Rosenquelle.

Two other baths also fed by the Rosenquelle, the Corneliusbad and the Rosenbad, belonged to private individuals. The Corneliusbad derives its name from Cornelius under whose patronage it was established by its owner; the Rosenbad was called after the proprietor, a certain Herr Rosen. Close by these baths which still retain the same names, there are now—to complete the list—the Neubad, formerly called the Bath of the Three Kings, (fed from the Kaiserquelle by a special conduit) also the Karlsbad, called after the Emperor Charles VI. The last named bath, now separate, in the seventeenth and eighteenth centuries was combined with the Corneliusbad under the title of Herrenbad.

In 1656 the town of Aachen was again much injured by a great fire. The conflagration must have been terrible as many of the bath establishments fell a prey to the flames. However, in this conflagration there was probably destroyed much that

<sup>1</sup> Höhlbaum, Das Buch Weinsberg, II, p. 101.

needed improvement and accordingly new bath houses and their appurtenances arose in a style more suited to the times. About that time (1660) the Rosenbad appears to have become the property of the city. New life now sprang from the ruins and Aachen began to realise the idea one conceives from the expression wateringplace. From this time we have detailed accounts of the life and season at the waters and there begins to be a tolerably important literature concerning the baths of Aachen and other matters connected with them.

Of special importance is the work of Franciscus Blondel which was published in several languages and which forms the chief source of study of the bathing arrangements of that time. Blondel, it appears, quarrelled with the Superintendant of the baths, at that time Dr. Didier of Sedan<sup>1</sup>, and each published literary attacks on the other. Blondel asserted that he was the first to introduce drinking the waters as a means of cure in this place which certainly does not appear to have been correct as from old writings it is evident that the waters were used for drinking long before Blondel's time. Blondel appears rather to have made the drinking of the waters fashionable and thereby to have attracted many strangers to the place.

In the work above mentioned Blondel gave himself the title of "Oldest Physician of the City, the first Inventor and Originator" as regards the drinking cure and fought hard against all attempts to diminish his services to the city.

According to Blondel the Kaiserbad had five and the Kleinbad four baths. These baths were from 12 to 15 feet long, 9 to 10 feet wide and 4 to 6 feet deep; the water had to rest fourteen to eighteen hours in them in order to be sufficiently cooled. Seats were placed around the baths for rest, refreshment, and amusement and there were adjoining rooms with couches for sweating. The Quirinusbad had three similar baths.

Besides the bath proper a kind of *douche* was applied in

<sup>1</sup> Rathsprotokolle, 1660, Sept. 14.



these tanks. Water was pumped up into a high placed cistern and thence allowed to fall upon the diseased part of the body. Arrangements were also made for vapour baths almost in the same way as in those of to-day. They used an enclosed box which allowed the head of the patient to remain free and into which the steam from the thermal waters was introduced from below. The Corneliusbad had five bathing places and also several rooms for douches. Blondel does not say how many tanks were in the Rosenbad. It appears to have been still in connection with the Armenbad and the latter was much used for washing and cleaning the cloth manufactured here.

Bathing took place here in April, May and June, as well as from the middle of August to the middle of October. In winter it appears there was no bathing as that time of year was considered unsuitable and bathing rather injurious. Blondel mentions all manner of diseases that were sent here to the baths. By far the greatest number of cases were those who had gout, rheumatism, skin-diseases, scabies &c. and such as suffered from "the French disease." Moreover women came with all kinds of diseases peculiar to their sex, uterine congestion, catarrh etc. At that time all bathed together and Blondel warns the bathers against too much talking or singing, as well as against eating or drinking while in the bath, yet it appears that the use of refreshments—fruit juices and so forth—during the bath was quite the general habit of the time. The separation of the sexes was first ordered by a decree dated 30 June 1698. In Volume 44 of the Official Protocols of the city of Aachen under that date we find the following:—

"It is further resolved that the sexes be separated in the baths and that men and women shall be prevented from bathing together by a fine of ten gold gulden, unless in the case of a man bathing with his wife or parents with their children".

The service of the baths was carried out by females, in the Rosenbad only were there male attendants.

Blondel gives an emphatic warning against remaining too

long in the bath and against using the waters at too high a temperature. He also alludes to the Latin Proverb

*Balnea, vina, venus currumpunt corpora nostra  
Restituunt eadem, balnea, vina, Venus.*

which he translates as follows;

Bäder, Weiber und der Wein  
Unsers Leibs verderben sein;  
Selben setzen wiederumb ein,  
Bäder, Weiber und der Wein.

The duration of a bath was between thirty minutes and one hour.

In the matter of drinking things were done that seem quite incredible. Fourteen glasses, according to Blondel, were accounted little; indeed, from 200 to 600 ounces were drunk daily by one person. Blondel's son has the special merit of having increased the quantity to be consumed in the "Drink-cure" much beyond that fixed by his father. The water of the Corneliusbad was chiefly used for drinking. The most frequented drinking fountain was in front of the Corneliusbad on the site of the present Kurhaus. Here was displayed every morning a gay picture of persons of various nationalities listening to the music and passing the time in all sorts of amusements. Besides this Cornelius-fountain there was another in front of the Kaiserbad which does not appear to have been much frequented in Blondel's time.

The distribution of the water was carried out by a special attendant, the "Schenker", who pumped the water into the drinking fountain and on whose proposition an order was made in 1662 that "the drinkers should give the "Schenker" something for his trouble, or pump up the water themselves". The Schenker in 1668 received the sole right of keeping and presenting the drinking-glasses.

According to Blondel the number of diseased and infirm persons cured by drinking the waters was innumerable. We find in Blondel's work interesting and carefully written accounts of all sorts of diseases though of course in accordance with the state of medical science at that time.

Considering the very great advantages that the city derived from the visits of strangers it is not at all surprising that the municipality limited as far as possible the exportation of the waters though much desired in other places. Numerous entries in the Official-Protocols tell us that the water was sent away in specially constructed bottles only at the written request of exalted personages or physicians. Blondel was well recompensed by the municipality for his labours and his book was translated into French, German and Dutch at the expense of the town. In 1686 Blondel was appointed one of the city physicians together with Dr. Tournell. After the death of the former in May 1703 his widow received a yearly pension of 112 Gulden.

In this way and by means of medical and chemical writings which were widely disseminated Aachen gradually became a very important watering place. Princes and Kings coming hither from far and near sought and found relief or cure for their sufferings. Persons of high position and noble families were accompanied by their own physicians who looked after them and treated them during the Cure. These physicians, however, were not allowed to practice generally during their stay. At any rate it appears that a foreign, "anabaptistical" physician was forbidden to practice under a penalty of ten gold gulden.

In the beginning of the eighteenth century the baths were greatly improved and embellished. The Corneliusbad and the present Karlsbad especially were completed<sup>1</sup>. Much progress had already been made about this time in other improvements. Amongst other things Dr. Oliva made use of the thermometer in the preparation of baths for princely personages, but the use of this instrument seems not to have been thought necessary for the baths of ordinary mortals.

During the Spanish War of Succession many of the wounded were brought here and were allowed to bathe in the Armenbad free of charge at the expense of the town. In the first half of

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<sup>1</sup> Janssen, Chronik, «1723 ist das Cornellesbat gebauwet».

the last century amongst the distinguished visitors were Peter the Great of Russia, Frederick II of Prussia and his brother Henry. Händel also found relief here from his sufferings and gained bodily and mental vigour for the creation of his immortal oratorios.

Aachen and its baths suffered considerably during the War of Succession, but was in some measure indemnified by the Congress of 1748 and became all the more celebrated. At this time the Kaiserquelle was opened for persons of the highest class who were presented with sulphur from it. Thus it was opened in 1747 for Field-Marshal Batthyani who was reproached with the smallness of his *pourboires*<sup>1</sup>, and in 1780 for King Gustav of Sweden. We must not, however, omit to state that the reputation of Aachen was assailed from other places, especially by physicians. In Janssen's *Chronik* in 1748 two physicians of Spa who had abused the baths of Aachen were overwhelmed with not very complimentary epithets and reduced *ad absurdum*. In 1750 after a violent earthquake, on account of a report that the wells were dried up, they were examined by the city physicians who published a counter-declaration. Even at that time a jealous competition existed between the various baths and continues to the present day.

During the Seven Years War there were several wounded soldiers at the baths. The French, especially, had settled here and had even founded a hospital, the physician of which, Dr. O'Kean became celebrated by his translation of the works of the English physician Dr. Lucas, "*Essai sur les eaux d'Aix la Chapelle et de Borcette, Liege 1762*". This is a valuable and sterling work on these springs which attracted much attention especially on account of its chemical analyses. Lucas considered it necessary to closely examine and describe these baths a second time, although as he remarks "the world is sick of dissertations on all the most frequented mineral springs, whether thermal or cold." He is opposed to limiting the season and considers that with certain precautions

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<sup>1</sup> Janssen, *Chronik*.



one may bathe and drink at any time of the year. In the case of delicate persons he orders asses or cows milk as an adjunct to drinking the waters, he likewise recommends abstinence from all mental work. According to him the baths of Aachen hold the first place amongst the baths of the world for construction and comfort. Apart from rheumatic and gouty disorders these baths according to Lucas are useful beyond anything else in cases of mercurial poisoning. In his opinion after many years the mercury again enters the blood stream from the hidden recesses of the body, the patient finds the taste in his mouth and the metal is eliminated with all the secretions. Many physicians says Lucas, believe that the mercury is eliminated through the pores of the skin in such quantities that little globules of quicksilver form in the beds of the patients, but the author prudently adds, that he has never been able to observe this phenomenon himself. Lucas also mentions the chalybeate waters of this place, namely; the Spabrünnchen discovered in 1671 which still exists under this name on the present Pontdrischplatz.

About 1740 the interesting and more popular work "*Amusemens aux eaux d'Aix la Chapelle*" appeared from which we learn much concerning the proceedings at the baths and during the bathing season. Morning concerts took place several times a week at the drinking fountains, and balls were also given three times a week for the visitors in the so-called Redoute, now the Kurhaus. There was already talk of a gaming bank (although the town bank was only established under a decree in 1764) as well as many places outside the town which still afford pleasant resorts and distractions.

In 1769 the owner of the Kleinbad was permitted at his own request to call his place "*Königin von Ungarn*" and to display a portrait of the Queen of Hungary on the front of his house.

Whilst the administrators of the baths were occupied in all manner of ways in improving the life there and had great success therein since the number of visitors steadily increased, there was approaching our town from the west the great revolution of the



last century which spread itself over our province and the subsequent fall of the Holy Roman Empire gave a death blow to its freedom and prepared a speedy end to all its splendour and privileges. From the town calendar of the year 1789 we gather that the bathing season began on the first of May and lasted until the autumn, the drinking fountains ran from 6 until 9 in the mornings and music was performed for an hour daily.

Twelve physicians lived here at that time. In the baths there were four scarifiers, and three female rubbers. A theatre was established for the alternate performance of opera and drama. The new Kurhaus (Redoute) especially was finished about this time (1764) and was destined to provide the necessary amusement for strangers; balls, games and other distractions were well provided for in this place. The Kurhaus was erected opposite the ancient Trinkbrunnen on the Bend. The last served at that time as a promenade having been purchased by the municipality at the end of the seventeenth century and was gradually increased by the purchase of neighbouring lands. The Kurhaus, with the exception of a few alterations and additions, such as when in 1863-1865 great concert halls were built, is the same as it was a hundred years ago. In the course of time the Budenplatz lying behind the Kurhaus, was changed into the Kurgarten and this also was considerably increased in recent times by the purchase of neighbouring buildings.

During the French revolution many emigrants came here but they were obliged to fly on the approach of the French troops. The uncertainty which prevailed everywhere during the wars of the Republic and later of the Empire was by no means favorable to the baths. They were then turned into a military bath of which France possessed at that time thirteen, though at a later period this number was reduced to four.

Napoleon I is known to have had a special liking for Aachen. He wished to be thought a successor of Charlemagne and did as much for the baths as for the town. In 1804 he came here for the "cure" with his consort Josephine and bathed under the

guidance of Dr. Reumont during two months. A special tank was erected in the Karlsbad large enough for him to swim in. Other members of his family stayed here at various times in order to take the baths. In 1804 Louis Napoleon, King of Holland, came here and later on his sister Pauline and Queen Hortense. The French engineer Belu received a commission to put the Rosenbadquellen in order, but he began the works only in 1808 which progressed but slowly. In 1810, a sum of 83,000 fr. had been spent and in the same year a supplemental grant of 125,000 fr. was given. Owing to the difficulties of the excavations and construction as well as the circumstances of the time which prevented the assemblage of proper workmen the work was not finished until 1811. In this bath two swimming baths for soldiers were constructed. The idea of combining the Karlsbad, Corneliusbad and Rosenbad in one immense bathing establishment was unfortunately not carried out. The buildings of the Rosenbad remained much longer without being enclosed and the Badhaus did not reach its present state until 1829-30.

In 1811 Napoleon I arbitrarily declared these baths and springs to be the property of the state; however, he was generous enough to grant the town the income from the baths for twenty-five years and after that it was to have an annual compensation of 45,000 fr. Fortunately the time soon came in which it was no longer necessary for the great Napoleon to pay this sum. After he had disappeared from the horizon the baths and houses were restored to the city by Friedrich Wilhelm III, at that time Governor of the Rhine Provinces.

Under Napoleon I the Kaiserbad also was repaired and the springs made deeper. These works on the whole were very insignificant in comparison with those at the Rosenbad. The design of building an enormous bathing palace on the site of the present theatre was unfortunately not carried out. The insufficient supply of the thermal waters prevented its accomplishment.

In 1818 Aachen saw many Princes, great statesmen and a

brilliant suite assembled within its walls for the memorable Congress. Metternich lived at that time at the Karlsbad.

When the baths again became the property of the town, as mentioned above, the times became more settled and trade and commerce began to flourish once more under the Prussian government. The foundations of the Trinkbrunnen were laid on Nov. 15. 1822 and following Schinkel's design developed into a magnificent building in the Greek style. It was opened for use in 1825 under the name of Elisenbrunnen in memory of the Crown Princess, afterwards Queen Elizabeth. The Theatre was built about this time according to the plans of the same architect. In the course of this century many alterations were also made and new buildings undertaken at the baths. In 1851 the Quirinusbad and in 1852 the Comphausbad were completely rebuilt. In 1850 the Kurgarten and the Elisengarten were remodelled for the purposes for which they are now used.

The most important construction was that of the Kaiserbad in 1862-5. The old Kaiserbad and the adjacent bath of the Königin von Ungarn were rebuilt and formed one magnificent structure worthy to take rank with the finest bath establishments of the world. Previously a new bath house had been erected in the Edelstrasse and dedicated to the Queen of Hungary. For the construction of the Kaiserbad careful investigations were made by distinguished geologists by borings sunk in the wells themselves. On account of a difference in their views deeper borings were not made, but the spring is sufficient at the present time to supply the three baths; Kaiserbad, Königin von Ungarn and the Neubad as well as the Elisenbrunnen. In 1877-8 considerable additions and improvements were undertaken at the bath of the Königin von Ungarn but as the bath hall absorbed all the available space and an increase in the number of dwelling rooms was rendered necessary for this purpose a handsome building of red sandstone was erected. It was during the sinking of the foundations of this building that the entrance of the old Roman bath already mentioned was found.

The gaming tables existing for the amusement of the bathers were of considerable advantage to the town, but like all similar institutions, presented their shady side, and were abolished in the year 1851. With the remaining funds of this gaming bank in the following year the beautiful municipal Mariahilf-hospital was built.

There are lists of visitors to the baths which go back to 1779. These in recent times are not of any special value as shewing the actual attendance at the bath since a large number of persons merely passing through are included. In the year 1779 there were 350 and the number gradually increased until in 1789 it was 1300. Amongst the distinguished patients who recently visited the baths we may perhaps mention King Max of Bavaria in 1850, Princess Louisa, now Grand Duchess of Baden; in 1856; Princess Karl of Prussia, 1859-60; Duke George of Saxe-Meiningen; King Charles XV of Sweden, 1872; and the Queen of the Belgians, 1880-81. Lately a special drinking fountain was erected in the Elisengarten which is a very great convenience to the visitors who have no longer to go up and down the steps in the hall of the Elisenbrunnen.

With a view to the improvement of the baths we have introduced a new system of douches in the Kaiserbad and which will be immediately added to the other baths. It is no longer necessary to regulate the temperature in the reservoir, but in the bath room itself the temperature can be regulated by the doucheur by a simple apparatus from which the warm and cold water come properly mixed. There is a doucheur and doucheuse in every bathing house. They have to undergo an examination before they are appointed in order to test their skill and knowledge. Visitors may therefore entrust themselves to their charge without anxiety.

During the past few years many valuable publications by the physicians here, have appeared concerning these baths. Some of these treat especially of the possibility of a winter cure and of the way in which it should be carried out.

The bath season proper begins about the first of May and



ends in the middle of October. Three concerts take place daily, and great fêtes are held in the beautiful places lying outside the town, the Lousberg, Aachener Wald &c. Moreover many other amusements are provided by the administration for the visitors, such as balls, pic-nics, popular fêtes &c.

The exportation of the waters in comparison with those of other bathing places is not important. This is accounted for by its chemical constitution. In recent years by the abstraction of the sulphur and introduction of carbonic acid an agreeable table drink has been made from the sulphurous water which compares favorably with the well known effervescing mineral waters. The baths under municipal control have been placed by the government under the superintendence of a Royal Bath Inspector. This post is at present filled by the justly celebrated balneo'ogist, Dr. Lersch, to whom we owe so many interesting details in the history of our baths.

A special municipal committee has the duty of superintending the bath establishments as well as of organising the amusements. It also takes upon itself the duty of providing entertainment for the visitors.

In concluding this section it is my pleasing duty to express my best thanks to the town librarian, Herr Schwan, as well as to the keeper of the Archives, Herr R. Pick, for their kindness in supplying me with materials for my work.







II.

AACHEN, ITS GEOGRAPHICAL POSITION,  
THE TOWN AND ITS ENVIRONS, CLIMATIC AND  
HYGIENIC CONDITIONS

BY

J. BEISSEL, M.D.





### GENERAL SITUATION.

**T**HE city called Aachen (Aix-la Chapelle, Aquisgranum, formerly also Acha and Ach) lies in Lat. North.  $50^{\circ} 47' 8''$  and Long. E.  $25^{\circ} 44. 56$ . Ferro<sup>1</sup> in a valley, having somewhat the shape of a caldron, in the hilly country between the highest crest of the fens and the flat Dutch land of Juliers, on very undulating ground; the middle of this forms the prolongation of a crest, which attains 200 m. just in front of Jacobsgate and on the market place 175,71 metres. Aachen is closely connected with the neighbouring town of Burtscheid which is built in the valley and on the banks of the Burtscheid brook.

### GEOLOGICAL CONDITIONS OF THE TOWNS OF AACHEN AND BURTSCHIED.

Both towns are situated on layers of the devonian formation which form a saddle in which the devonian limestone runs in two parallel zones from S.W. to N.E. It is from these strata that the thermal springs burst forth. The space between the two limestone zones is filled with gray slate which is often mixed with scattered reniform pieces of limestone. The ground is of the same formation beneath the old town where it comes to the surface in many places. In the south eastern part of the town of Aachen

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<sup>1</sup> =  $50^{\circ} 47.8$  N. lat. and  $6.4''$  long. East of Greenwich. *Trs.*

it is covered over to varying depths with debris, mould, gravel, white, or bluish gray clay and water worn gray slate. All these layers are stained brown or red in many places by infiltration with iron. The limestone vein at Aachen lies doubtless in contact with the coal mines.

To the south of the Burtscheid limestone ranges the upper devonian and the coal bearing limestone form a band about 1000 metres wide.

This limestone layer of Aachen is covered in the southwestern part of the town by the hill of the Aachener Wald which belongs to the chalk formation and consists partly of Aachen sand, green sandy marl and marl mixed with flints. This group of connected hills together with the hill of the Aachener Wald forms a semi-circle about the town sending spurs towards it which form the sandy and porous substrata of the western portion of the town as far as the Rheinischer Bahnhof and part of the Hochstrasse.

Quite in the north of the town isolated masses of chalk are to be found, namely: three hills separated only by slight depressions and composed chiefly of Aachen sand. One of these hills, the Lousberg, rises to a height of 264.4 m. above the sea level. The northern part of the town and the Stadtpark are situated on this ground which in consequence of its porous nature allows the streets and roads to become rapidly dry and free from water even after heavy rain.

### ENVIRONS OF AACHEN.

The first of the hills above mentioned, the Lousberg, the plateau of which is covered by the splendid park, is separated by a slight depression from the St. Salvatorberg and the Wingartsberg. The former was laid out as a garden and park and is surmounted by the new Salvatorkirche; the other is included in the Stadtpark. These hills lie in the immediate neighbourhood of the city which is built on their southern declivities, while the portion of the Aachen valley lying to the north of the Lousberg is called the



Sörs. These mountains, therefore, are isolated in the valley where they form a circle of elevations and slopes.

If a person standing on the highest of these hills, the Lousberg, directs his view towards the south, the horizon is bounded by a series of undulating hills which are not unlike a great rampart. These hills form part of the Hohe Venn, by which name is known the entire plateau lying between the rivers Warche, Roer, Inde and Vesdre. This has a height of 693.6 m. The Aachen, Cornelimünster and Malmedy Railway runs through the hills which in their deep cut water courses and lofty heights present a landscape of peculiar beauty which is only slightly excelled by the Moselle and the Rhine. The Hohe Venn is separated only by a slight depression from the Ardenne whose dark forest-clad summit can be seen in clear weather from the watch tower on the Branderberg. The northern slope of the mountain sinks gradually and the post road to Trier shows itself as a broad straight band on its surface. On this side are Schloss Schoenforst, Dorf Forst and the great iron works of the Rothe Erde. The valley of the Münster river and the celebrated Cornelimünster are on the steep southern side of the Venn. On the N. E. and S. E. the view is limited by the hills of Eilendorf which are situated on the right bank of the Haarbach. There are the hills of Nirm (229.4 m.), Haaren, Verlautenheid, Haal and Kaisersruh which from Verlautenheid almost to Haal are formed from the devonian series, the other hills belonging to the coal formation. Here and there one can see a range of distant summits which are those of the heights between Vicht and Wehbach. One can also perceive the summits of the great Reichswald on the Nirm - Höhen behind which on a clear day a cloud indicates the position of Stolberg, celebrated for its iron, glass and tin works. The forest approaches quite close to the city and covers with woods the hills of Burtscheid and Aachen which consist of the chalk formation. These hills enclose the valley on the south and west almost in a semi-circle and attain their greatest height in the Elleterberg of the Burtscheider Wald which is 392.6 m. above the level of the

sea. The most important hills of the Aachener Wald are the Steineknippsrücken (346.2 m.), crowned by a tower 50 ft. high, the Karlshöhe (334.2 m.), and the summit of the Friedrichsberg and Preussberg (321.0 m.). If one looks at the immediate surroundings from the summit of the tower just mentioned one sees an unbroken forest which extends across the Belgian and Dutch frontiers and covers an area of 491 hectares. By the establishment of well kept roads, points of observation, as well as by the erection of seats and good restaurants (Carlshöhe, Rhonheide, Linzenhäuschen, Siegel &c.), this wood is well suited for walks, and even longer excursions on foot, on horse-back and by carriage. The direct distance from the terminus of the tramway to the edge of the forest varies from  $1\frac{1}{2}$  kilometres, as at Siegel, to 4 kilometres. The Rhine Railway runs direct to the forest (Rhonheide Station) in a few minutes.

The conical hills between Vaels and Gemminich are connected with the Friedrichsberg and are well known to palaeontologists on account of their richness in fossils which are found in wonderful profusion in the marl and green sand. These hills extend to the neighbourhood of the Goelthal to which one can get from Aachen by means of the Welckenrader Railway. The Goelthal is celebrated for its great foundries and mines as well as for its legend of Eginhard and Emma. The romantically situated Emmaburg is well worth a visit.

A long range of hills extends around the Aachen valley from the west to the north-west. This is the eastern spur of the Orsbacher and Vetschauer Plateaus which attains a height of 234.8 m. above the sea level and terminates by joining itself with the chalk hills on Dutch territory. A spur of these heights is also remarkable, the Kirchberg von Laurenzberg for the white church and the great linden trees about it. This hill is 216.5 m. high and is situated in a north-easterly direction from the Lousberg.

If one looks from the Pryamidenplatz of the Lousberg towards the north one sees between the north-west and north-east the crest of the table land from Richterich to Kaisersruh.

The well wooded slopes from north to north-north-east are the plantations at Berensberg and the little Paulinerwald. Between the latter and the heights extending to the north-east towards Kaisersruh is the ravine through which the brook Wurm leaves the valley of Aachen. Behind this crest the table land extends far to the north and gradually sinks in the same direction. The view extends into the farthest distance and one can see the numerous chimneys of the coal district from the Dutch territory in the north-west to Hoengen in the north-east. Indeed on a fine day the church towers of Erkelenz and Sittard are visible with which the Lousberg forms a triangle of the second order.

The connection of Aachen with its beautiful well wooded hills is maintained by means of five railways as well as by tramways and carriage roads.

Special express train services establish communication with England, Belgium, Holland, France and the chief towns of Germany and the Rhine in the shortest possible time and almost without changing carriages.

### CLIMATE.

The climate of the Aachen valley is mild and uniform; in summer there is no great heat, whilst in winter the temperature does not remain long below freezing point (about 14 days on an average). Meteorological observations have been carried out in Aachen by Professor Heis from 1847—52, by Geh. Rath Dr. Schaper from 1868—71. Since 1872 Aachen has been one of the meteorological stations established in Prussia. At the present time Prof. Dr. Sieberger is the head of the observatory.

The mean barometer, at 0° and at an elevation of 176.76 m. above the sea level is 745.96 mm.<sup>1</sup> and the mean temperature is 10.26° C. In the spring it is 9.42° C., in summer 17.55° C., in autumn 10.55° C. and in winter 3.26° C. The mean daily temperature in various months is as follows:—

<sup>1</sup> About 29.36 inches. *Tys.*

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|         |      |          |      |       |      |      |           |
|---------|------|----------|------|-------|------|------|-----------|
| January | 2.1  | February | 4.0  | March | 5.6  | Mean | = 3.9° C. |
| April   | 9.4  | May      | 12.6 | June  | 16.6 | "    | 12.86° "  |
| July    | 21.1 | August   | 17.9 | Sept. | 15.3 | "    | 18.1° "   |
| Oct.    | 10.2 | Nov.     | 6.0  | Dec.  | 2.7  | "    | 6.3° "    |

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The highest temperature ever observed in Aachen was 27.2° R. (26 July 1872, at 3 p. m.) the lowest, — 15.4° R. (8 Dec. 1871) an approach to these extreme temperatures is indeed very rare.

The relative moisture of the atmosphere shows an average of 73 per cent. The average number of rainy days in Aachen throughout the year is 153, thunderstorms 13 to 20 and snow falls on about 20 days. The days with a low barometer are about 193. The average annual rain-fall is 831.4 mm. The prevailing direction of the wind is S. W., then W. and N. W. and very seldom S. or N.

### THE CITY OF AACHEN.

In this valley with its relatively mild climate which shows the richest variety of wood and field, mountain and valley, industrial activity and idyllic quiet, lies the ancient imperial city and bathing place of Aachen. It is closely connected with the neighbouring town of Burtscheid and has about 100,000 inhabitants. Both places taken together have about 120,000, though they still form quite separate towns and are not united under a single corporation. According to the last census (1 Dec. 1885) there were in Aachen 45,780 males 49,945 females forming together 18,563 families. These occupy 5,451 dwelling houses. The mass of houses is overtopped by the dome of the Pfalzkapelle of Charlemagne the founder of the city. Around his palace now recognisable only by ancient ruins and before which a Merovingian Palace doubtless occuppied the site of the present Rathhaus — the old parts of the city developed themselves in the course of time. Destroyed by fire and hastily rebuilt it was unavoidable that these ancient streets were limited in their proportions by the mediaeval fortifications and were accordingly narrow and crooked. The present administration, however, has been able to let the



sunlight in by means of passages, streets and squares. The new portion of the city has broad, straight streets which like most of the squares are planted with trees.

On the site of the old palace, destroyed so many times, the Rathhaus was built in the first half of the thirteenth century in a simple, but imposing style. Its eastern and western sides are terminated by two strong towers. The restoration of the Rathhaus, begun in 1847, was interrupted in an unexpected manner by a fire in 1885 whereby the roofs of the towers and the middle portion of the building were reduced to ashes. If a visitor ascends the wide stair-case to the large banqueting-hall in the interior of the building a certain feeling of satisfaction is experienced that the fine frescoes of Alfred Rethel between the buttresses and copings representing a series of incidents in the life of Charlemagne have been preserved.

The chapel of the Palace, the present Cathedral, is formed of a series of very different specimens of architecture connected with the old Carolingian church and destined with it to supply the requirements of the ceremonies attendant on the coronation of the Emperor and those of the pilgrimages. The belfry and choir belong to a later period. The altar is situated on the site of the Carolingian church, it is built without buttresses in the purest and simplest gothic style. Though a description of the curiosities of the place should be left to the local guide-books and guides yet we cannot omit to mention the fact that Aachen possesses in these ancient buildings a museum of the most interesting kind both in its architecture and in the rare works of art preserved therein. Everything here tends to render historical memories more vivid as not only legends and local history are linked with the Cathedral of Aachen, but also the history of Germany itself in all its relations. Thirty two princes and twelve princesses have been crowned here to kings and queens of Germany and Charlemagne and Otto III have found here their last resting place.

Amongst the important buildings of Aachen are the Polytech-

nic, the Kurhaus and the Elisenbrunnen. The Kurhaus is decorated in the French style, with large ball-, concert-, and reading-rooms. The Elisenbrunnen having a large garden on the Friedrich Wilhelm Platz is the mineral Trinkbrunnen. A colonade built after Schinkel's design in the Doric style is named after the Consort of Friedrich Wilhem IV. The Stadttheater, Museum and Kaiserbad are the largest and finest of the endowed buildings and are worthy of the greatly increasing population.

Aachen possesses a large number of hospitals, the principal of which are the Mariahilf Hospital, the Louisen Hospital, the Lunatic Asylum and the new Ophthalmic Hospital. Strangers are admitted to all of them on suitable conditions and cases of emergency obtain gratuitous treatment in the polyclinics. For poor visitors there is the Aid Society (Verein zur Unterstützung) which on production of the necessary evidence will bear the entire expense of the treatment. The present medical officer is Dr. Hommelsheim. The numerous hotels of every class make a visit possible to persons of even the most moderate income as well as to those who desire every possible luxury. One can stay a month in Aachen for about 250 to 300 marks<sup>1</sup> and easily cover all the necessary expenses of the treatment. Aachen also offers all the attractions of charming surroundings as well as those of a large town: Theatre, Concerts, Museums, scientific lectures, meetings, &c.

The hygienic requirements of a great community are carefully attended to in every way in Aachen. In the first place there is an adequate supply of excellent drinking water provided by the great city conduits and their net work of pipes in every street. The aqueduct takes its water from the Eicher lime stone ranges by means of great coffer dams which serve as reservoirs. The outlet in the dam is placed so high that all parts of the city even the most elevated, are supplied with water at a pressure of

<sup>1</sup> £ 12.10 to £ 15. — English visitors will probably find this minimum too low to meet their requirements and that from £ 20 to £ 25 a month is about the mark. *Trs.*

1 to 2 atmospheres. The daily consumption of water, often about 5000 cubic feet, has always been met, with the exception of a very short time in the summer of 1885 when the supply had to be limited. An enlarged coffer dam will in future give a sufficient water supply so that not only the sanitary requirements (street cleaning and watering, cleansing of canals &c.) but also the increasing demands of manufacture can be satisfied, to the fullest extent. Moreover, six older private conduits carry a large supply of good drinking water to the city. Sunk wells are therefore but little, if at all, used.

Reports of observations on the condition and fluctuation of the subterranean water in Aachen are not available, but these are in general dependant on the amount of moisture and on the volume of the brooks which flow through the precincts of the city. These waters are turned to many industrial uses and yield on an average the respectable quantity of 75,355 cubic feet.

The canal water is carried in great pipes of cement and the gutters and latrines are all fitted with good syphon-traps. Disinfecting houses and abbatoirs are partly finished and partly in course of construction.

The state of health of the inhabitants of the place is correspondingly favourable, although naturally it does not stand as high as that of a purely agricultural population. The necessity of earning their bread in the factories compels both men and women to absent themselves the greater part of the day from their homes so that they can give but little care to the bringing up of their offsprings. According to the report of the General-Sanitary-Officer (Dr. Trost) the mortality amongst children under one year is fifty three percent of the total deaths. The most frequent causes of death are diseases of the respiratory organs; the epidemic occurrence of infectious diseases has not been observed in recent years. The number of births in 1885 was 4355, of marriages 760 and of deaths 2458. The mortality of Aachen compares favourably with that of other large towns such as Cologne, Berlin, &c. being about 19 per 1000.





III.

THE BATHS, THEIR USES AND PHYSIOLOGICAL  
EFFECTS.

BY

J. BEISSEL, M.D.





## THE BATHS.

**T**HE thermal springs of Aachen and Burtscheid issue from the parallel limestone ranges already mentioned. A line joining the place of issue of the hot spring of Burtscheid and a similar line from the Kaiserquelle to the Rosenquelle at Aachen are likewise parallel. The thermal waters are scattered through the interstices of the limestone and generally speaking follow the same course. These clefts are in hydrostatic communication with one or other of the mountain ranges, so that the water cannot be lowered in one spring without influencing the level of the water in the others and especially that of the water in the limestone. This has been proved many times both by intentional and unintentional experiments during the construction of the bathhouses and can still be observed daily in Aachen when the lowest flood-gate of the Kaiserquelle is opened whereby a lowering of the water level takes place causing at the same time a fall in the water level in the springs which are situated on the same limestone range: Quirinus-, Rosen- and Corneliusquelle. During the laying of the foundations the system of communicating passages in the limestone were accidentally discovered. These had been tunnelled by the water in the course of time and again became partly closed and obstructed by stalactites and they consequently often end blindly in the limestone. The thermal water either flows or stands still in these places and in some of these natural

cavities a collection of gas is found. The gas, however, never reaches so high a pressure that it is able to drive out the thermal waters in an effervescing form, but they are really forced out by hydrostatic pressure. The similarity in temperature and in the amount of chloride of sodium contained by these springs proves that they have a common source. Corresponding temperatures can be found in all these springs at depths of from 4 to 5000 feet. The limestone vein can scarcely reach to so great a depth, the thermal waters must therefore penetrate through it so that their actual source is to be sought elsewhere. Experiments carried out by analysing the limestone prove that this is the case, for this species of stone does not contain the smallest trace of chloride of sodium in which the thermæ are so rich, and moreover the quantity of carbonic acid in the springs at their outlets is much greater than would correspond with the amount of bicarbonate in the limestone. According to the careful investigations of my father<sup>†</sup> there is certainly no doubt that the water which in Aachen and Burtscheid springs from the devonian limestone has its source in the silurian and devonian layers of the Venn and Ardenne mountains lying to the south of the Aachen valley and follows the course of a fissure of enormous depth which cleaves the mountains from north to south thereby opening a passage for the waters pent up within these layers. The difference in the temperature and saline contents of different springs is therefore only the result of cooling, mixture and dilution which takes place during its passage to the individual outlets. The temperature of the waters used for therapeutical purposes is from 38.° C. to 72.° C. and they contain from 22 to 28 grammes of chloride of sodium, 4 to 5 grammes of sulphites and 8 to 12 grammes of carbonates in 10,000 ccm.

A closer insight into the chemical constitution may be gained from the following analytical tables of analyses of the different springs according to the arrangement of Dr. Fr. Raspe.

<sup>†</sup> Der Aachener Sattel und die aus demselben vordringenden Thermalquellen von Ign. Beissel. Aachen 1866.



|                          | Aachen              |                   |                  |                      | Burtscheid-Aachen     |                  |                     |
|--------------------------|---------------------|-------------------|------------------|----------------------|-----------------------|------------------|---------------------|
| Name of well:            | Quirinus-<br>quelle | Kaiser-<br>quelle | Rosen-<br>quelle | Cornelius-<br>quelle | Schwertbad-<br>quelle | Koch-<br>brunnen | Victoria-<br>quelle |
| Iodide of Soda           | 0.0051              | 0.005             | 0.005            | 0.0048               | 0.002                 | —                | 0.002               |
| Bromide of Soda          | 0.036               | 0.036             | 0.036            | 0.036                | 0.017                 | —                | 0.011               |
| Sulphuretted hydrogen    | —                   | —                 | —                | —                    | —                     | 0.031            | 0.018               |
| Sulphate of Sodium       | 0.0234              | 0.136             | 0.0747           | 0.0544               | 0.0007                | —                | —                   |
| Chloride of Ammonia      | —                   | —                 | —                | —                    | 0.079                 | —                | 0.070               |
| Chloride of Sodium       | 25.915              | 26.516            | 25.415           | 24.605               | 28.135                | 26.967           | 27.782              |
| Chloride of Lithium      | 0.033               | 0.033             | 0.033            | 0.033                | 0.110                 | 0.0004           | 0.040               |
| Sulphate of Potash       | —                   | —                 | —                | —                    | 1.685                 | —                | 1.665               |
| Sulphate of Soda         | 1.516               | 1.527             | 1.540            | 1.566                | 3.075                 | 3.788            | 2.783               |
| Sulphate of Strontium    | 0.003               | 0.0025            | 0.0034           | 0.0024               | 0.007                 | 0.067            | 0.042               |
| Bicarbonate of Soda      | 7.880               | 9.186             | 7.549            | 7.094                | 8.761                 | 11.092           | 9.024               |
| Bicarbonate of Magnesia  | 0.509               | 0.771             | 0.404            | 0.379                | 0.416                 | 0.309            | 0.439               |
| Bicarbonate of Lime      | 2.474               | 2.274             | 2.648            | 1.898                | 2.680                 | 1.620            | 2.085               |
| Sesquicarbonate of Iron  | 0.072               | 0.131             | 0.083            | 0.083                | 0.005                 | —                | 0.025               |
| Bicarbonate of Manganese | —                   | —                 | —                | —                    | 0.004                 | —                | 0.007               |
| Phosphate of Soda        | —                   | —                 | —                | —                    | 0.006                 | 0.189            | 0.007               |
| Arseniate of Soda        | —                   | —                 | —                | —                    | 0.00035               | —                | —                   |
| Silicates                | 0.620               | 0.661             | 0.593            | 0.597                | 0.738                 | 0.720            | 0.663               |
| Argillaceous Earth       | —                   | —                 | —                | —                    | 0.0007                | —                | —                   |
| Organic substances       | 0.978               | 0.769             | 0.915            | 0.927                | 0.026                 | —                | 0.016               |
| Temperature              | 42.982              | 44.481            | 42.118           | 40.144               | 45.749                | 45.473           | 44.688              |
|                          | 49.7° C.            | 55° C.            | 47° C.           | 45.4° C.             | 74.6° C.              | 72.5° C.         | 59.9° C.            |

## GASEOUS CONSTITUENTS.

|                                 | Kaiser-<br>quelle | Cornelius-<br>quelle | Rosen-<br>quelle | Quirinus-<br>quelle |
|---------------------------------|-------------------|----------------------|------------------|---------------------|
| <i>Gases absorbed in water.</i> |                   |                      |                  |                     |
| Nitrogen                        | 9.00              | 7.79                 | 9.14             | 6.41                |
| Carbonic Acid                   | 89.40             | 92.21                | 90.31            | 93.25               |
| Carburetted Hydrogen            | 0.37              | a trace              | 0.55             | 0.26                |
| Sulphuretted Hydrogen           | —                 | —                    | —                | —                   |
| Oxygen                          | 1.23              | —                    | —                | —                   |
|                                 | 100.00            | 100.00               | 100.00           | 100.00              |

|                              |        |        |   |   |
|------------------------------|--------|--------|---|---|
| <i>100 volumes of water.</i> |        |        |   |   |
| Nitrogen                     | 66.98  | 81.68  | — | — |
| Carbonic Acid                | 30.89  | 17.60  | — | — |
| Carburetted Hydrogen         | 1.82   | 0.72   | — | — |
| Sulphuretted Hydrogen        | 0.31   | —      | — | — |
| Oxygen                       | —      | —      | — | — |
|                              | 100.00 | 100.00 | — | — |

*Absorbed gases set free by boiling in vacuum.*

|                       |        |         |        |        |
|-----------------------|--------|---------|--------|--------|
| Nitrogen              | 12.78  | 12.54   | 14.71  | 7.31   |
| Carbonic Acid         | 126.94 | 148.46  | 145.40 | 106.30 |
| Carburetted Hydrogen  | 0.52   | a trace | 0.89   | 0.30   |
| Sulphuretted Hydrogen | —      | —       | —      | —      |
| Oxygen                | 1.76   | —       | —      | 0.09   |
| Total volume          | 142.00 | 161.00  | 161.00 | 114.00 |

*Total volume of absorbed carbonic Acid.*

|                                             |       |     |     |     |
|---------------------------------------------|-------|-----|-----|-----|
| Free and partly com-<br>bined carbonic Acid | 251.5 | 283 | 252 | 154 |
|---------------------------------------------|-------|-----|-----|-----|

From their temperature these springs belong to the class of *thermæ* or *hot waters* whilst they are also characterised as *salt* by the amount of chloride of sodium which they contain. The richness in sulphur and alkalies of most of these springs at once places them in the balneological system in the category of alkaline muriatic sulphur waters.

It may be seen from the foregoing tables that the Burtscheid waters are the hottest and the richest in mineral contents, whilst the sulphurous principles so important for many therapeutical purposes, prevail in the waters of Aachen. It is only in the lower lying Burtscheid thermæ, such as the Carlsbad and Rosenbad, that a slight trace of sulphur is perceptible and they scarcely reach the strength of the weaker springs of Aachen. The stronger sulphuration of the hot springs of Aachen is explained by the position of the devonian limestone layers from which they burst forth. These layers extend far over the coal bearing mountains and the shale of these hills is particularly rich in organic materials (bituminous shale) and in iron pyrites. Since the alkaline waters in their subterranean course doubtless come in contact with these iron pyrites from this it may be inferred that the various combinations of soda and potash with sulphur arise in this manner. The free carbonic acid contained in the wells partly splits up the sulphites and forms hydrothionic acid which is immediately absorbed and on issuing from the spring disappears with the other gases.

Moreover the distinction between the springs of both districts consists in the difference of temperature and in the amount of chloride of sodium, the latter in all the springs above mentioned equally and correspondingly lowering with the temperature. The waters used for baths vary in temperature from 47.0 to 74.6° C. The Mühlenbadquelle in Burtscheid has the latter temperature and is the hottest spring in all central Europe, hotter even than the Karlsbadsprudel. At present the most celebrated spring in Aachen is the Kaiserquelle (55° C.) which supplies the magnificent Kaiserbad, the Neubad, the bath house of the Königin von Ungarn and

the Elisenbrunnen drinking fountain; there is also the Quirinusquelle ( $49.7^{\circ}\text{C.}$ ) in the bath-house of the same name; the Corneliusquelle ( $45.8^{\circ}\text{C.}$ ); the Rosenquelle ( $47^{\circ}\text{C.}$ ) and a pair of unnamed springs in the pavement of the Comphausbadstrasse which feed the Rosen-, Cornelius- and Comphausbaths.

Slight fluctuations in the composition and temperature of the springs used for therapeutical purposes have been observed in the course of a considerable time. The variation in temperature, however, was never more than  $1$  or  $2^{\circ}\text{C.}$  and is caused chiefly by gradually increasing formation of stalactites at the place of exit. When the obstructing mass has been removed the temperature rises with the increased flow to its wonted height. The unenclosed and unused springs which are found on the borders of the limestone veins are naturally not uninfluenced by the fresh water circulating in these rocks, the water level on the other hand affects many springs in regard to their temperature and contents of chloride of sodium. This circumstance is of great importance as regards the legal protection of the wells against excavations and mining. However, in order that there may be no misapprehension on this point it may be definitely stated that the springs proper under normal conditions could not ever be disturbed in either their physical or chemical constitution.

The actual quantity of water delivered by the springs cannot be ascertained with certainty as it varies with the depth of the channel very much. The exact quantity delivered for bath purposes at the present time and with the present depth of stream after an undisturbed flow of 14 to 17 hours by the so-called upper springs (Kaiser- and Quirinusquelle) is 365 cubic metres, and by the lower springs (Rosen- and Corneliusquelle) 412 cbm in 24 hours, or taken together 777 cbm = 25,135 cubic feet. In Burtscheid the quantity of water must far exceed 21,350 cubic feet in the same time, for the water from about nine other springs is not included in the calculation. The flow therefore from both districts should be about from fifty to sixty thousand cubic feet in 24 hours and is sufficient to supply 2750 to 3000 baths of 20 to 27 cubic feet each daily.



## USES OF THE BATHS.

In order to avail of the thermal waters for the purpose of cure small shafts have been sunk in the limestone after first removing the overlying layers of earth to a depth of at least  $9\frac{1}{2}$  metres. These shafts serve also as basins for the springs and are surrounded by a thick wall. The water has been prevented from escaping through any accidental lateral openings by stopping these with thick cement or where this was not possible and the ground afforded a firm foundation open shafts have been built over the most important openings until the highest water level was reached and were then closed in. The bursting forth of the well water is prevented by the weight of the column of water which they contain. How difficult and how costly this work was in ground permeated by hot water may be gathered from the drawings by Belu, Chief Engineer of Napoleon I, which date from the beginning of this century and represent the works for the erection of the Rosenbad.

In the well room the height of the water and its constitution have been established by experiment and chemical analysis and an overflow pipe has been placed in a suitable position through which the thermal water flows to the bathing places. At the same time the overflow is saved as much as possible and flows either directly into the baths or is first led into a cooling tank. As the quantity of water hitherto obtained has been sufficient for the requirements of the baths the idea of procuring a greater supply of water by means of an artesian well has been given up for the present, the more so as it has been contended by many that if the water were obtained from a greater depth the loss of certain chemical constituents should be feared.—These circumstances as well as the development of the town itself determine the position of the baths in the immediate neighbourhood of the thermal springs on the limestone veins permeated by the hot water. If this has some drawbacks it has also some very exceptional advantages. Amongst the latter are that the air, the floors,

and the walls of the bath-rooms and bathing tanks are uniformly warmed both in summer and in winter by the hot water coursing through the ground. The uniformity of the required temperature of 30 to 35° C. could not have been attained by the most carefully constructed artificial means and this circumstance forms an important adjunct to the methods of treatment carried out here.

As is evident from the foregoing description the waters of most of the thermal springs are too hot for immediate use. A part of the water used for the baths or douches is raised by means of pumps and is cooled in elevated tanks. The cooled thermal water is then mixed with the hot water so that any required bathing temperature can be attained. The bath is filled by means of two pipes one having hot and the other the cooled water. The individual baths are very roomy each containing 0.75 to 1 cubic metre and more of water, they are built in the warm ground and are almost all lined with white marble or white enamelled slabs. As the edge of the bath is on a level with the floor of the room the bather descends into it by means of commodious steps, so that the necessity of climbing over the edge of the bath, so difficult for invalids, is thereby obviated.

There is a douche apparatus in every bath room. It is necessary to call special attention to the excellent arrangement and construction of these appliances in Aachen. The water for the douche is raised into tanks 20 to 30 feet above the level of the bath itself from which it passes by small indiarubber or leather hose to the bath room where the douche is to be employed and it can be directed in a powerful stream on any desired part of the body of the bather by means of jets furnished with stop cocks. An extremely ingenious arrangement enables the doucheur to maintain any desired temperature. The hot and cooled thermal water passes in two separate pipes from two cisterns placed 1.4 m above the surface of the bath into a box strengthened by iron bands, the pipes end on the floor of this box by sloping openings so that the hot and cooled water are brought into immediate contact. But in order to attain a still more intimate mixture of

the water it is forced by the great pressure of its fall through a series of perforated plates which are fixed at a certain distance from each other inside the mixing-box. By this careful mixture an even temperature is maintained which can be regulated by means of cocks and can be accurately controlled by the thermometer placed in the mixing-box. From the mixing-box the water ascends to a height of several metres above the floor of the bath from the iron bound box by excess of pressure into a siphon-like pipe which ends in a leather or india-rubber hose. The strength of the douche can be regulated by a stop cock and the orifice of the hose arranged according to the directions of the physician by means of various wide and narrow jets. The douche is always administered in the bath itself. The doucheur or doucheuse enters the bath-room with the patient and supplements the action of the douche by means of kneading and massage, or moderates the force of the jet with his hand whilst he allows it to play in a slanting direction. The patient does not need to go into a separate douche room as is the custom in so many other establishments, but he remains some time longer in the bath after the douche in order to assist its action.—Vapour baths have been erected in all the bath houses and are supplied by the natural hot vapours of the thermal waters, which are formed either at the outlet of the lower spring or whilst flowing down in one of the channels fed by the principal spring. The vapours are led through air tight passages into a thick wooden chest in which the patient sits on a wooden stool and in which his whole body with the exception of his head is exposed to the influence of the hot vapours and natural gases. The neck of the bather is padded round with towels in order to hinder the escape of the vapours and to prevent them coming into contact with the organs of respiration. The quantity of gas contained in the vapour chest is about 500 litres and according to the researches of Dr. Wings this consists of 0.0093 to 0.0141 grammes of sulphuretted hydrogen, or 6.28 to 9.09 cc. at 0° C. The quantity of carbonic acid in 10,000 volumes of the vapour is from 29.06 to 85.63 volumes,

which reckoned in litres in the case of the chest of 500' litres would amount to 1.45 to 4.28 litres. The amount of chloride of sodium contained in the vapour is from 0.0003 to 0.0073 grammes in 500 litres. The temperature in the vapour chests varies from 37.7 to 49° C. In Aachen the highest temperature attained in these vapour baths is 44 to 46° C., in Burtscheid 50° C. (Lersch).

The vapours are also used as inhalations. In a room in the Kaiserbad lined with enamelled tiles there is a fountain-like arrangement which allows the free developement of the vapours and gases. The vaporised thermal water can also be inhaled in this room from suitable spray apparatus.

The waters of the Kaiserquelle and Rosenquelle may be used for drinking purposes in the bath houses of the same names. Those of the Kaiserquelle flow either uninterruptedly or at certain times of the fountain of the Elisenbrunnen to which they are conducted by a pipe which open below the level of the fountain.

At Burtscheid the Victoriabrunnen in the Trinkhall of the Burtscheid Kurgarten and the water of the Grossbadquelle in the fountain in front of the Schwertbad are used for drinking, the water of the wells in the Grossbad serves a similar purpose at the fountain on the Burtscheid Marketplace.

## PHYSIOLOGICAL EFFECTS OF THE AACHEN THERMAL WATERS.

According to the method in which they are employed the waters of Aachen produce a different effect which chiefly consists in a quickening of the process of assimilation and in an easier formation of the final products of digestion. This is less perceived after the use of ordinary baths but is much greater and more marked after the douche and vapour baths.

On first entering an ordinary bath of the temperature of the body the bather experiences for a moment a more or less marked feeling of oppression, the pulse and respiration become more frequent and many feel increased pressure in the bladder with a desire



to micturate. These phenomena are explained by the mechanical pressure which is exercised by the weight of water on the surface of the bather and also by the nervous stimulation caused by the difference between the temperature of the air in the bath-room and that of the bath itself. From both these circumstances, the mechanical pressure and the nervous stimulation, an emptying of the superficial blood vessels takes place, the blood being driven from the skin towards the internal organs. The increased action of the lungs and heart soon brings about a reaction and after a short time in the bath a feeling of comfort is experienced. The similarity in the temperature of the blood and that of the water in the bath prevents that stimulation of the nerves of the skin by the difference in temperature of the external air which mostly influences our nervous system.

If the temperature of the bath exceeds that of the body by many degrees the effects are different. Baths of  $30^{\circ}\text{R.}^1$  were employed for these investigations. The researches of many writers prove that in a bath of such a high temperature an elevation of the temperature of the body takes place so that after a continued stay of fifty minutes in such a bath the heat of the body may be greater than even that of the bath. Experiments made by me with maximum thermometers carefully isolated, so that the conduction of the higher temperature of the water to the instrument was prevented, have generally confirmed this statement. When the thermometer was placed under the tongue the temperature rose from  $36.55$  to  $37.20^{\circ}\text{C}$  after 15 minutes in a bath of  $30^{\circ}\text{R.}$ ; the temperature in the rectum was from  $35.5$  to  $38.2^{\circ}\text{C.}$ ; in the axilla it was between  $37.0^{\circ}$  and  $37.3^{\circ}\text{C.}$  Towards the end of the bath (30 minutes) the temperature in the rectum was only  $37.8$ , and half an hour after the bath it was the same as at the beginning of the experiment.

The action of the heart in such a hot bath varies according

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<sup>1</sup> 9 degrees Fahrenheit are equal to 5 Centigrade or 4 Réaumur. In calculations allowance must be made for the freezing point of Fahrenheit being at  $32^{\circ}$  while in the others it is at Zero. *Trs.*

to the sensibility of the bather, but is more or less increased during the whole time of the bath (88, 94, 100) and it often happens that the normal action is reestablished only after several hours. In many patients the influence of such a bath is of much longer duration and may make itself unpleasantly evident in increased nervous irritability and sleeplessness.

The thermal bath does not appear to exercise any special increasing influence on the tissue metabolism, especially as regards the elimination of urea, uric acid, or sulphuric acid. My earlier investigations<sup>1</sup> with regard to this question show that the amount of urine passed in twenty-four hours is diminished though its specific gravity is increased. The quantity of uric acid and urea excreted is a little less than on normal days.

Dr. S. Lehmann [in his investigations of the Oeynhausien Baths obtained similar results. The researches of Dr. E. Lehmann also show that the thermal baths in comparison with baths of ordinary water at the same temperature do not exercise a greater, but on the contrary a less influence on diuresis. The increased stimulation of the skin by ordinary thermal baths produced by their salts and gases is not followed by any increase in the excretion of urine, nevertheless their influence in the general metabolism cannot be unimportant. The greater activity of the lungs already mentioned doubtless brings about an increased excretion of gaseous material and by the increased activity of the skin this takes place to a still greater degree. During the bath slight perspiration generally takes place on the head; an increased tendency to sweat over the whole body occurs after the bath and in certain cases can be maintained still longer by suitable means.

It is worthy of note that for the purpose of causing increased secretion and perspiration of the skin a bath in Aachen of 28.°R. of half an hour's duration makes the skin soft and moist and the chlorides and bicarbonates contained in the water free it in the simplest and most agreeable manner from adherent epidermic scales;

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<sup>1</sup> Balneol. Studien von Dr. J. Beissel, Aachen. Benrath & Vogelgesang.

moreover by the opening up of the sebaceous and sweat ducts all obstructing masses of secretion are easily removed. Whilst these circumstances favour the increased excretion of gaseous and fluid substances both during and after the bath, the skin is also prepared for taking up medicinal substances which are employed with effect in the course of certain methods of treatment.

### THE DOUCHE.

The action of the immersion bath is accompanied in this place by the chemical and thermal action of the douche. This species of bath is a remarkably energetic remedy especially as regards the local and general metabolism. The douche has a special, direct influence on the circulation in the affected part whilst by the shock of the stream the blood is driven from the surface and fills the vessels of the deeper tissues and organs. Partly by the *vis a tergo* and partly by reflex nervous action a return of the blood to the affected part takes place, caused by the application of the douche and by the active dilatation of the vessels of the skin. The arteries expanded by the reaction of the douche form the most natural path for the removal of detached masses of exudation, especially when the process is correspondingly aided by suitable manipulations. Douches of various temperatures following each other in short alternation bring about a rapid expansion and contraction of the superficial blood vessels and exercise an important influence on the distribution of the blood in the glandular organs of the abdomen as well as in the brain and spinal cord. The nervous stimulation produced by the difference in temperature is refreshing and exciting and requires to be carefully watched in diseases of the nervous system and in paralyses. The same may be said of the use of shower baths of cold water (11 to 12°C.) from the city water pipes after the use of the thermal bath. By this means immediate and powerful stimulation of the nervous system is produced and contraction of the vessels and pores of the skin takes place in a reflex manner

whereby the sensibility to changes of temperature and the liability to catch cold is diminished.

Besides this unquestionably great influence on the local tissue changes the action of the douche on the general metabolism must be specially noticed.

| Days | Amount of urine<br>in 24 hours | Urea<br>in 100 cc. | Uric Acid<br>in 100 cc. | SO <sub>3</sub><br>in 100 cc. | PO <sub>3</sub><br>in 100 cc. | Urea<br>in 24 hours | Uric Acid<br>in 24 hours | SO <sub>3</sub><br>in 24 hours | PO <sub>3</sub><br>in 24 hours | Specific<br>gravity |
|------|--------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|---------------------|--------------------------|--------------------------------|--------------------------------|---------------------|
|------|--------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|---------------------|--------------------------|--------------------------------|--------------------------------|---------------------|

*Normal days.*

|                                                  |      |      |       |      |   |       |      |      |   |      |
|--------------------------------------------------|------|------|-------|------|---|-------|------|------|---|------|
| Average of 3 days<br>in earlier experi-<br>ments | 1893 | 1.98 | 0.045 | 0.11 | — | 37.00 | 0.87 | 2.11 | — | 1018 |
|--------------------------------------------------|------|------|-------|------|---|-------|------|------|---|------|

*Days on which douche was applied.*

|   |      |      |      |      |   |       |      |      |   |      |
|---|------|------|------|------|---|-------|------|------|---|------|
| „ | 1653 | 2.83 | 0.12 | 0.15 | — | 42.16 | 1.91 | 2.34 | — | 1016 |
|---|------|------|------|------|---|-------|------|------|---|------|

*Days after the douche.*

|   |      |      |      |      |   |       |      |      |   |      |
|---|------|------|------|------|---|-------|------|------|---|------|
| „ | 1900 | 1.58 | 0.05 | 0.09 | — | 24.26 | 1.01 | 1.92 | — | 1013 |
|---|------|------|------|------|---|-------|------|------|---|------|

*Normal days.*

|         |      |      |       |   |       |       |       |   |      |      |
|---------|------|------|-------|---|-------|-------|-------|---|------|------|
| I.      | 2176 | 1.11 | 0.016 | — | 0.086 | 24.15 | 0.343 | — | 1.87 | 1014 |
| II.     | 2006 | 1.72 | 0.027 | — | 0.129 | 34.50 | 0.215 | — | 2.59 | 1017 |
| III.    | 2052 | 1.31 | 0.020 | — | 0.128 | 27.07 | 0.210 | — | 2.63 | 1015 |
| Average | 2078 | 1.38 | 0.021 | — | 0.114 | 28.57 | 0.256 | — | 2.36 | 1015 |

*Days, on which douche was applied.*

|         |      |      |       |   |      |       |      |   |      |   |
|---------|------|------|-------|---|------|-------|------|---|------|---|
| I.      | 2016 | 1.72 | 0.02  | — | 0.16 | 36.54 | 0.45 | — | 3.45 | — |
| II.     | 2096 | 1.70 | 0.027 | — | 0.12 | 35.62 | 0.55 | — | 1.29 | — |
| III.    | 1880 | 2.00 | 0.026 | — | 0.22 | 37.25 | 0.52 | — | 2.63 | — |
| Average | 1997 | 1.80 | 0.024 | — | 0.16 | 36.27 | 0.50 | — | 2.45 | — |

Some time ago together with Geh. Rath Dr. Mayer I called attention in the *Berliner Klinischen Wochenschrift* to the douche with regard to this point. In view of the importance of the subject repeated experiments have been made the results of which are seen in the above tables. Of the earlier experiments the average figures only are given.



It can be seen from both series of experiments that the douche has an influence in increasing the quantity of urea and uric acid excreted in twenty four hours, whilst no change of any importance was produced in the excretion of sulphurous and phosphoric acids. It is improbable that the formation of urea and uric acid is increased by the douche. There is merely an acceleration of the removal of the quantity stored up in the fluids and tissues of the body. This view is supported by the fact that on the days following the douche the increase in the excretion of urea and uric acid did not continue and only reached a similar height after several days accumulation and excretion.

### THE VAPOUR BATH.

The vapour baths of Aachen belong to the class of hot baths. On entering into the compartment filled with the hot vapour the entire surface of the body encounters the thermic stimulation of a vapour streaming in from the hot spring at a high temperature. It condenses on the colder skin of the bather in a thousand little drops and prevents the evaporation of the perspiration. The temperature of the body rises in proportion to that of the bath and may attain to 38.0 or 38.9°C.; the frequency of the pulse is correspondingly increased. The respiration becomes more rapid, especially towards the end of the bath. The only way in which the body can regulate its temperature is by the respiration and observation shows that the number of respirations may rise to 30 per minute.

The vapour bath powerfully stimulates the skin causing a dilatation of its vessels and a consequently increased quantity of blood in that tissue, and the quantity of carbonic acid in the vapour increases this effect. It is a well known and often described fact that our mineral waters charged with carbonic acid excite the functions of the skin and influence the nervous system in a refreshing and stimulating manner. The large quantity of sulphuretted hydrogen contained in these waters is also of import-

ance as regards this effect. The sulphur collects in the course of time in pretty considerable quantity on the inside of the vapour-bath and during the bath falls in finely divided particles on the skin of the bather. The healing and astringent effects of sulphur in such a finely divided state have been established by the investigations of Unna although the previous experience of a century at the sulphur baths points to the same conclusion.

The vapour bath has almost the same elevating influence on the general tissue metabolism as the douche bath. As I have already stated in the published accounts of my earlier researches<sup>1</sup>, the percentage of the individual constituents in the total diminished quantity of urine is not only increased, but the entire amount of urea, uric and sulphuric acids excreted in twenty-four hours is augmented.

TABLE OF TISSUE METABOLISM DURING THE USE OF THE  
VAPOUR-BATH WITH SUBSEQUENT HOT BATH (30° R.)

|                                                | Quantity<br>of urine | Sp. gr. | Urea<br>in 24 hours | Uric Acid<br>in 24 hours | SO <sub>3</sub><br>in 24 hours |
|------------------------------------------------|----------------------|---------|---------------------|--------------------------|--------------------------------|
| <i>Normal days.</i>                            |                      |         |                     |                          |                                |
| I.                                             | 1800                 | 1015    | 34.2                | 0.80                     | 2.52                           |
| II.                                            | 1750                 | 1018    | 36.8                | 1.00                     | 2.62                           |
| III.                                           | 1650                 | 1016    | 35.4                | 0.95                     | 2.72                           |
| Average                                        | 1733                 | 1016    | 35.5                | 0.91                     | 2.62                           |
| <i>Days, on which vapour baths were taken.</i> |                      |         |                     |                          |                                |
| I.                                             | 1400                 | 1020    | 36.4                | 1.01                     | 2.59                           |
| II.                                            | 1070                 | 1025    | 37.9                | 1.39                     | 2.61                           |
| III.                                           | 1500                 | 1024    | 39.0                | 1.20                     | 2.77                           |
| Average                                        | 1323                 | 1023    | 37.7                | 1.20                     | 2.63                           |

## INTERNAL USE OF THE THERMAL WATERS.

The drinking of a sufficient quantity of fluid is indispensable for the solution and excretion of the increased amount of final

<sup>1</sup> Balneol. Studien von Dr. J. Beissel, Aachen. Benrath & Vogelgesang.

products which results from the augmented tissue metabolism caused by the bath. A normal condition of the kidneys being granted the complete excretion of urea and uric acid from the body is dependent on a quantitatively sufficient diuresis. Now, the urine of a healthy man is quite saturated with these substances by means of its power of solution. The fluid cannot dissolve any more uric acid even by shaking or letting it stand in a test tube, or by filtering it through a filter strewn with crystals of uric acid, on the contrary, a precipitation of these substances takes place. According to my investigations, in recently voided urine which contained 0.181 of uric acid in 1000cc. after the above mentioned experiment there was only 0.0092 in 1000cc. and at a temperature of  $15^{\circ}\text{C}$ . it deposited half the uric acid it originally contained.

These characteristics of the normal urine become essentially changed after the use of the warm alkaline thermal waters. The urine at a temperature of  $15^{\circ}\text{C}$ . in consequence of its increased alkalinity is now able to dissolve in a test tube an additional half gramme of pure uric acid, or exactly 0.4710 gramme. After the use of a litre of this water the urine of the same man instanced in the above experiment can dissolve a larger quantity of uric acid. If before the use of the water it contained 0.605 of uric acid in 1000cc. its concentration diminished on the day on which a litre of the thermal water was taken, and contained only 0.162 of uric acid in 1000cc. This urine can now by filtration on a uric acid filter take up a further quantity of uric acid so that it may contain 0.311 in 1000cc. Therefore while the urine of this man prior to the use of the thermal water precipitated uric acid and was apparently saturated with it the fluid excreted at the end of the tissue changes after drinking the thermal water could still dissolve the further considerable amount of 0.149 gr. in 1000cc. at  $15^{\circ}\text{C}$ .

The excretion of urea, uric and sulphuric acids in a healthy man shows an increase after the use of the Aachen thermal waters. My earlier published investigations show that the quantity of urine is increased during the first four hours after taking the thermal water and the quantity passed during twenty-four hours after

drinking 1200cc., but with the same manner of living, fluctuates between 2700 and 2900cc. The specific gravity of the entire quantity varies from 1012 to 1016. Reckoned in per centages the proportion of solid substances is accordingly diminished; but the quantity passed in twenty-four hours greatly exceeds the normal average. When therefore the urea on normal days was only 37.2 to 35.47, after the "drinking-cure" it increases to 40.5 grammes. The excretion of uric acid behaved in a similar way. Whilst on normal days it varied between 0.41 and 0.70, after drinking 1200cc. of the thermal water it rose to from 1.2 to 1.25 in twenty four hours.

The manner in which the excretion of uric acid proceeds after drinking the thermal water (Elisenbrunnen) is worthy of notice. The quantity of  $\text{SO}_3$  excreted under precised similar conditions of life is from 2.62 to 2.72 grammes in twenty-four hours. It is increased after drinking 1200cc. of the thermal water to 3.045 or 3.23 in twenty-four hours whilst there is only 2.18 after drinking the same quantity of the town pipe-water. We may here call attention to the great effort of will which it costs to drink 1200cc. of cold water on an empty stomach in the morning and that that organ is thereby much more disturbed than by drinking the same quantity of the warm salt-laden thermal water. One can see the effect of the absorbed  $\text{H}_2\text{S}$  in the increase in the excreted sulphuric acid in the urine, for it is evident that with a strictly similar mode of living the increase in this constituent of the urine could not be explained by the destruction of the albumen of the tissues.

From the great quantity of alkali which the Aachen water contains it has no slight influence on the formation of acid in the stomach and organism generally and although its direct influence on the excretion of oxalic and phosphoric acids cannot be numerically stated, at the same time, it is certain that by taking alkalies in this form an excessive accumulation of organic acids is oxidised and thereby avoided.

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II.

SPECIAL PART.

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THE DISEASES TREATED WITH SUCCESS  
IN AACHEN.





I.

GOUT

BY

G. MAYER, M.D.

GEHEIMER SANITÄTSRAT.





**A**MONGST the diseases treated with success in Aachen gout (Arthritis Urica) doubtless deserves a place in the first rank.

In the *Berliner Klinischen Wochenschrift*, 1884 N<sup>o</sup> 13, I published, in collaboration with my colleague Dr. J. Beissel, a short paper "Aachener Thermalkur und Gicht" in which Dr. Beissel proved by special experiments on the metabolism that by the use of the thermal douche at Aachen the excretion of uric acid in the urine was greatly increased. Beissel in his "Balneologische Studien über die Aachener und Burtscheider Thermalquellen" had already shown in 1882 that such a greatly increased excretion could be brought about by thermal vapour baths.

To these investigations I added some practical observations on the success which attended the thermal treatment of gout in Aachen and I am now, supported by the experience of four years, able to confirm and extend them.

I should also like to take this opportunity to lay before the reader some views based on a long experience of arthritic gout and its relation to other diseases. The efficacy of the Aachen thermal waters in gout is highly esteemed by almost all ancient balneological writers; Garrod, the founder of the modern views of this disease gives these waters a principal place in his treatment and Cantani holds them in as great esteem. Ebstein and Senator also mention our baths, Robson Roose, the most recent English writer on gout gives still further details. At the same time the

importance of Aachen as a place of treatment for this disease has not been generally recognised as it deserves at least with us in Germany, although Flechsig in his new bath guide has done the fullest justice to our brochure above mentioned. In that publication I expressed myself in the following manner: "For a long time I did not believe in the efficacy of our springs in cases of gout. Apart from the theory that disturbances of the abdominal functions are always the exciting cause of the disease I have sent many patients away from here and especially to Karlsbad. Only during the last ten years it has become clear to me how well deserved was the ancient reputation of the Aachen thermal cure, especially drinking the waters and douches, in the treatment of gout. Patients, and specially those from the neighbouring towns of Belgium where our springs are greatly in vogue observed that after a three or four weeks "cure" their usual attacks of gout either remained altogether absent or were considerably milder and less frequent. Such has been the experience of many patients during several years and the opportunity not unfrequently occurred of showing contrary instances: if a "cure" was not carried out in summer the attack occurred in the winter or in the spring with its customary violence. The number of patients treated here by me for true gout has considerably increased during recent years. While in the six years including 1872 and 1877 I saw only about 81 gouty patients amongst 2000 visitors that is 4 per cent, the number increased to 17 or 5 per cent in 1879, in 1880 to 21, or almost 6 per cent, in 1881 to 29, or at least 7 per cent and in 1882 to 37, 1883 to 43, which number during these two years was 8 per cent of the total number of visitors treated by me.

During the four years following that publication i. e. 1884 to 1887 inclusive, the number of gouty patients increased still more so that of 2026 visitors treated by me during that time 239 made the "cure" for gout, this being 11.8 per cent of my total number of patients attending the "cure"; the highest number was attained in 1886 with 72 sufferers from gout. As already mentioned some of these patients had been here more than once so that the



number of "cures" for gout must be divided between 182 different persons. During these four years 291 "cures" were gone through under my direction for other joint affections so that the number of gouty patients treated here was 45 per cent of the entire number of my patients suffering from joint affections. Amongst these were 45 who had made more than one "cure", and indeed some had done so for the fourth, fifth and eighth time, one even for the thirteenth time. The number of such repeated "cures" which I can report by no means represents the real number as a great many of these patients having been here more than once and finding themselves well did not consult a physician; if the entire number of patients had presented themselves again our returns would be more complete.

As to the courses of treatment carried out during the last four years I can only confirm the unusually favourable results already communicated in which the attacks became less frequent and of much milder character. Very often indeed they were entirely absent during the year after that in which the "cure" was gone through although they had occurred once or several times in previous years; I will briefly refer to the history of some of these cases further on; they will help to support the conviction I expressed some four years ago that the thermal treatment at Aachen in combination with the necessary dietetic measures has an almost specific efficacy in a considerable number of cases of gout.

Before I enter into a detailed account of the method of our thermal treatment and the dietetic and medicinal measures to be combined with it I will make some remarks on the conclusions to be drawn from the observations made with regard to the course and complications of this remarkable disease and its distribution as well as on the theory of its essential nature.

¶ Of 310 different cases of gout which I have had under my care here in the years 1872—1887, many of them more than once, 166 were Belgians, 81 Germans living in Germany, 9 Germans living in Belgium, 5 in England, 3 in Amerika, 2 in Holland and

1 German living in Russia, 1 in France and 1 in Spain, making a total of 103 persons of German nationality. Amongst the others were 18 Dutch, 8 English, 6 French, 3 Russians, 2 Italians, 2 Norwegians, a Pole and an American. One can see from this that in Belgium, a land in which partly in consequence of the mode of living of the better classes, gout is a comparatively frequent form of disease, the efficacy of the Aachen thermal treatment is best known; at any rate Belgians generally formed a large contingent in my practice. Amongst the 81 Germans living in Germany 48 came from the Rhine Provinces and Westphalia, 33 from other parts of the Empire especially from the north. Naturally no conclusion can be drawn from these observations as to the geographical distribution of gout, and but little can be learned from them. I find Hirsch<sup>1</sup> quotes Coley (1853) as saying that gout was on the decline in Belgium; but one sees from my observations that it is still frequent enough. Undoubtedly drinking full bodied Burgundy to which a special influence in the causation of this disease was ascribed has greatly diminished. We find many remarkable and contradictory statements in writings on the geographical distribution of gout. Bouchard<sup>2</sup> alleges that it is very frequent in Holland, England and Germany, but does not mention Belgium at all. Hirsch<sup>3</sup>, quoting from Mayer states that gout is relatively frequent in Dresden, but on the other hand E. Wagner<sup>4</sup>, the physician so much consulted in Leipzig says that it is very rare in that city so near to Dresden. The opinion which I have formed after a careful study of this disease during many years is that gout is much more frequent in many countries where it occurs at all than is usually supposed. The slight cases are but little noticed, indeed many even severe cases are often not recognised and pass under other names. Many patients do not willingly admit that they are gouty; in Belgium

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<sup>1</sup> Historisch-Geographische Pathologie, 2 Aufl. II, S. 449.

<sup>2</sup> *Maladies par ralentissement de la nutrition*, Paris, 1885, p. 277.

<sup>3</sup> Loc. cit. S. 459.

<sup>4</sup> *Der Morbus Brightii*, Leipzig 1882, S. 295.

a number of cases of gout pass under the favorite name of "Rheumatism" or at any rate are called Rheumatic Gout. During the last five years I have taken the trouble to ascertain the number of gouty patients living in Aachen and Burtscheid and this does not by any means represent the entire number in these towns which have together a population of 100,000 inhabitants; I have, however, collected 38 cases; one can therefore describe the disease as occurring more frequently rather than seldom in our district. As far as my experience goes in the Rhine Provinces, in Holland and in Belgium gout is a disease of comparatively frequent occurrence. The gouty inhabitants of Aachen in so far as they may use the baths here are not included in our statistics of bathing visitors.

Amongst the 310 patients already mentioned there were 288 men and 22 women namely: 16 Belgians and 2 Germans living in Belgium, 2 English women, a German woman living in Germany and a French woman. In Belgium gout is a much more frequent disease in women than with us. The explanation is to be found in this, that there the women drink wine and beer more regularly and more frequently than in Germany. According to my experience, the extraordinary assertion of Germain See<sup>1</sup> that gout does not appear before the cessation of menstruation is absolutely incorrect. A great number of those women whom I know to be affected with gout, in all 23 had their first attack in their thirtieth or in the beginning of their fortieth year, one even in her twenty-eighth year. According to my observations there is one woman for every thirteen gouty men, Bouchard also agrees with this proportion, other authors found that gout is considerably less frequent amongst women and this is certainly correct as far as Germany is concerned.

Of my 310 cases I can give the date of the first attack in 233 instances; it occurred 95 times in the age between 31 and 40, 61 times between 41 and 50, 48 times between 20 and 30, 19

<sup>1</sup> Die Lehre vom Stoffwechsel und von der Ernährung, Deutsch von Salomon, Leipzig 1888, S. 310.

times between 51 and 60 and nine times between 61 and 70. One patient had his first attack, according to his own statement, when he was 71 years old.

It can be seen from this that middle life is the most common time especially the years between 31 and 40. The cases in which gout first occurred very late in life are partly those in which the patient had no very marked hereditary predisposition and in whom moderate living had postponed the occurrence of the attack, and partly those in whom other symptoms as for instance eczema, have shown themselves before as products of the uric acid diathesis. The statement that the first attack of gout most frequently takes place between the thirtieth and fortieth year is to be found in the works of most writers on this subject, See <sup>1</sup> alone dissents from the general opinion as he states that in 200 cases the disease occurred 60 times before the twentieth year.

I have been able to ascertain with certainty the joint first affected in 231 cases. According to the accounts of the patients the joint between the great toe and the metacarpal bone was attacked first in 197 instances, other joints of the foot in 27, the knee joint 4 times, the wrist twice and the shoulder once.

The practice at a bathing resort is not sufficient to enable one to investigate fully the various complications and causes of gout. It very often happens that one sees the patient only a few times and that one has not time for a thorough interrogation. What is even more important is, that one is exposed to so many deceptions. I can therefore make positive statements on these points only with regard to a certain number of my patients which may not be, however, wholly without interest and which I will try to make complete by instances from my private and consulting practice.

In many cases obesity is present; I have made a special note of this in 72 instances in which the body weight was 180—190—200 and even 230 pounds; it is well known that gout may attack thin people, especially if there is a hereditary predisposition; ne-

<sup>1</sup> Ibid.



vertheless it may be assumed that the greater number of the patients are well nourished and very fat, a circumstance which shows a certain analogy with diabetes to be afterwards referred to. In fifty cases it was admitted that very full bodied liquors had been consumed, but this figure in no way conveys an idea of the number of those who exceed proper limits with such drinks. Amongst these 50 patients there were 21 who consumed large quantities of beer and I must agree with Garrod as well as with Robson Roose that the consumption of large quantities of beer considerably aids the development of gout. This is much less the case with brandy which tends rather to cause diseases of the oesophagus stomach and liver as well as tuberculosis of the lungs, but seldom gives rise to gout, whereas on the other hand the drinking of wines, especially if full bodied as is so much the custom in North Germany, causes gout in the joints. Brandy is certainly consumed to a greater extent by the lower classes in whom the want of nourishing food gives less cause for the development of the uric acid diathesis whilst the wealthier classes are accustomed to take it only as an adjunct to other alcoholic drinks. I have only once seen a true attack of podagra amongst the working classes; the patient was a joiner's assistant who had undergone an operation in the Luisen-hospital and who had a characteristic attack of gout a few days afterwards; on questioning him we learned that he had been employed in a large brewery where he had unlimited beer and drank up to twenty glasses a day. Most beer drinkers, moreover, as long as they do not develop some disease of the internal organs as the result of their excesses are well nourished and inclined to the formation of fat. Another case was that of a man in very middling circumstances living in a little place near Aachen who being a traveller for a gin distillery consumed great quantities of that liquor and who suffered from the rare complication of gout and tuberculosis to be described later on. He belonged to an utterly broken down branch of a once noble and wealthy family and he inherited gout as his sole sad heirloom from ancestors who had lived in luxurious circumstances.



It is unnecessary to add that heredity plays an important part in the causation of gout; but I have not been able to collect sufficient data to enable me to arrive at any accurate conclusion on this point; however one can gather from reliable writers that at least in half the cases of gout there is a hereditary predisposition. It is also certain: that in those who have such a predisposition, a temperate mode of life does not always prevent an attack of gout; at the same time the very great rarity of gout amongst the female sex shows that the mode of life has the very greatest influence. Moreover, good living with but slight bodily or mental labour apparently predisposes to gout even without any specially great consumption of alcoholic drinks.

As I was able to ascertain the existence of old syphilis in thirty of my cases and recent syphilis in ten, these latter may indeed have come under my care on account of this condition; syphilis of old standing is frequently met with in connection with gout, and the above figures by no means express the true proportion, because the patients do not often feel themselves bound to make admissions which they regard as superfluous. I do not think, therefore, that syphilis exercises any influence on the causation of arthritic gout except in so far as it lowers the resistance of the body to all injurious influences, and since it is well known that attacks of gout readily take place after wounds, injuries, &c. it cannot appear surprising that symptoms of recent or old standing syphilis often predispose to an attack of gout. Of greater importance is the complication of gout with skin diseases especially eczema which I have not unfrequently seen. During the period of treatment of my 310 patients I saw amongst them 15 cases of eczema, 5 of psoriasis, 4 of urticaria, 3 of prurigo and pruritus ani. I was able to confirm with certainty the alternating occurrence of these symptoms with attacks of gout in several cases and as is admitted by Garrod, Senator, Ebstein and Robson Roose there can indeed be no doubt of a genetic connection between these skin affections and gout and that these eruptions are determined partly at least by the uric acid diathesis.

Bouchard especially points out eczema on the fingers as one of the forerunners of gout and though I find his picture of the premonitory symptoms in general somewhat highly coloured I am inclined to agree with him in this. It is quite certain that eczema especially is by no means always a local disease and though it, as every one knows, may be called forth by local irritation, the connection between the eczema of childhood and bronchitis with symptoms of asthma which I in common with so many other observers have noticed, and which affects so great a number of children who have suffered in a high degree from the so-called crusta lactea can only depend on some alteration of the composition of the blood; in these children a syphilitic taint often appeared to me to be present which, however, did not amount to positive syphilitic symptoms. Similarly in gout there is doubtless a connection with eczema and other skin diseases, especially urticaria, established by means of the condition of the blood. Since other authors have sufficiently illustrated this point I will content myself with bringing forward a case which appeared to me very instructive, in which an exceedingly obstinate pruritus ani was apparently attributable to this cause.<sup>1</sup>

Herr C., a Dutchman, aged thirty-six, a man about the town, fond of sport, an abundant eater, but not a drinker came here for treatment in 1880 on account of an intolerable pruritus ani which had lasted for about a year; the skin about the anus was cracked and raw and in parts moist and secreting. The effect of the bath cure was *nil*, local and internal remedies (carbolic acid in pills &c.) were also useless. In 1881 the patient came again for the cure and during his stay in consequence of the presence of certain cases of small pox he was vaccinated with very good results. Very soon after the normal developement of the vaccine pustule extremely painful inflammation of the wrist joint on the vaccinated side appeared which was followed after five days by a very characteristic attack of podagra for the first time in his life. The

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<sup>1</sup> See also Bouchard loc. cit., p. 287.

evidently gouty inflammation of the wrist joint lasted rather long whilst the podagra quickly disappeared. During the attack the pruritus ani was entirely absent but gradually returned though in a milder form and was not removed in the following spring even by a "cure" gone through at Karlsbad. In the years 1884-85 several attacks of gout took place in the great toe, the pruritus entirely disappeared and did not return in the following year in which the patient made use of the douche several times in Aachen, nor has it again occurred up to the present time. The gout now was absent for two years, but returned in 1887. The patient who continued to live very well and who had gone to Karlsbad and from thence to Gastein on account of dyspeptic troubles had now a new attack in the right foot and wrist joint, the pruritus had disappeared and remained absent. As in the case of eczema I might also establish with regard to urticaria a special relation in many instances to the gouty dyscrasia and I believe that under certain circumstances an obstinate attack of urticaria may excite suspicion of a gouty tendency.

Atheroma of the great arteries is also a very frequent complication of gout; I was able to ascertain the presence of atheroma of the aorta eleven times with certainty and cardiac insufficiency due to atheroma of the coronary arteries in 7 instances. Cerebral apoplexy had occurred in three of my cases. Diseases of the arteries are generally not amongst the rarer complication of gout and the abuse of alcoholic drinks has certainly its share in their causation.

It is a fact often enough stated that disturbances of digestion and congestion of the liver in many cases provoke an attack of gout; in 20 of my cases there were complaints of increased and prolonged disturbances of digestion, I made out enlargement of the liver 12 times, once in the form of hypertrophic cirrhosis. Farther on I will discuss the connection between gout and disturbances of digestion. As regards the causation of gout by lead poisoning I have been unable personally to collect sufficient material and must therefore rely on Garrod, Ebstein and others in

relation to this subject. In several cases acute rheumatism had occurred during youth, in others injuries had preceded the first attack of gout; it is certain that once gout has developed itself, wounds and injuries often provoke an attack and that podagra often occurs as the result of overexertion as in marching, hunting, &c. In many cases nervous excitement favours the outbreak.

In one case, in the course of the treatment here, hæmoptysis occurred apparently after an excessive use of the douche; slight thickening of the left lung was found. Naturally I suspended the treatment and the patient recovered completely from the pulmonary trouble and afterwards twice used the thermal cure with good result. The complication of gout with tuberculosis of the lungs is certainly rare, in my consulting practice I saw a second case of a man who drank brandy to excess. A third case came under my observation between 1876 and 1879. The patient was a German born in Aachen but living in Holland, he was 65 years old had suffered for thirty years from gout and had been confined to bed from the autumn of 1875 to the spring of 1876. In the summer of 1876 he had some baths and douches and drank the thermal water to which carbonate of lithia was added; he continued to take the lithia for four months after the course here. In 1877 and the following year he had a similar course of treatment and the deposits in the joints and ears disappeared to a great extent. When the patient returned here in 1879 I found tuberculosis of both lungs already far advanced of which he died some months later in the Luisen Hospital.

In the total number of 354 cases under my observation there were therefore only 3 complicated with tuberculosis of the lungs, one case was not quite certainly established. This number is therefore comparatively small. In the literature of this subject I find a fourth case observed by Bramson and reported by Ebstein.<sup>1</sup>

It has been observed by most authors that gouty patients

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<sup>1</sup> Natur und Behandlung der Gicht, Wiesbaden 1882, S. 92.



suffer from bronchitis and that they may also have symptoms of asthma. Their mucous membranes are apparently irritable and possibly in consequence of increased uric acid in the blood. The urinary organs, kidneys, bladder and urethra are often directly irritated by excess of uric acid in the urine. With reference to this point the well known case of Virchow's disease<sup>1</sup> is very instructive. Amongst my cases there were several in which attacks of gout were preceded by catarrh of the bladder and urethra and quite recently I saw a gouty patient who without ever having had gonorrhoea had for several days had an acrid discharge from the urethra which somewhat ulcerated it.

Naturally many patients had renal troubles, although as Ebstein, Robson Roose and others assert the kidneys may remain unaffected for a long time. It is evident that practice at a watering place is not of a character to assist in clearing up this point; amongst my 310 cases I noticed severe forms of nephritis 10 times either as parenchymatous or contracted kidney; in 3 there was a history of previous renal colic and of the passage of renal calculi, yet this by no means expresses the real frequency of this complication since such previous attacks are often forgotten or not mentioned by the patients.

It is well known that the theories on the subject of the frequency of the complication of gout and renal calculus are somewhat at variance. Virchow denies the frequency of their simultaneous occurrence according to his pathological experience. Hirsch found the geographical extension of both diseases by no means the same, but declares himself in favour of the theory which advocates the concurrence of both diseases. As by far the greatest number of urinary calculi are formed of uric acid they must indeed have some relation to the uric acid diathesis common to both. The older observers of the disease as well as Garrod, Senator, Ebstein, and Robson Roose have recognised this and have confirmed it from their experience. As regards my own personal

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<sup>1</sup> Berlin. Klin. Wochenschrift. 1884, S. 4.



experience, few of my patients under treatment here have complained of renal colic or passage of calculi; on the other hand I must add that amongst the 44 gouty patients belonging to this city and surrounding district who became known to me during the past 10 years there were at least 7 in whom the renal colic or the passage of uric acid calculi had occurred once or even more frequently.

I have twice also observed uric acid calculi in men of hereditary gouty tendency who had up to that time not developed an attack of gout. The passage of crystallised uric acid and especially the formation of sediments of urate of soda will be observed at times in every gouty patient, but it occurs so often in other people that no great stress can be laid on it; the frequency of the sediments of salts of uric acid is so dependent on the constitution of the urine, its acidity, the external temperature, the amount of fluid and nitrogenous food consumed, that one is justified in drawing a conclusion only after taking all these points into consideration. As Germain See states<sup>1</sup>, Lecorché found that there were attacks of renal colic 48 times in 150 gouty patients in consequence of urinary calculi and I am certain that if attention were directed to the connection between these two diseases one could frequently confirm this statement.

Amongst the 310 gouty patients already mentioned 5 suffered at the same time from *tabes dorsalis*, 4 men and 1 woman; there was a history of syphilis in four of these patients and they had used the inunction cure on account of ataxic symptoms with a certain success, in the fifth case a history of syphilis was denied.<sup>2</sup>

Diabetes is a disease in which an analogy with gout has been frequently sought, but at the same time I have never been able to prove a frequent connection between these diseases. Amongst the total of 354 gouty patients whom I have seen during recent years I have been able only twice to ascertain their simultaneous occurrence. One of these patients was a lady from Belgium who

<sup>1</sup> Loc. cit., S. 317.

<sup>2</sup> See further on my article on *tabes dorsalis*.

formerly weighing 190 pounds had suffered from diabetes for several years and who had already been four times to Karlsbad. She had the first attack of gout in both feet in June 1883 and very soon afterwards a second attack took place. When she came here on July 19 1883 the metatarsal joint of the great toe and the ankle joint were still swollen. In the following years she tried both Karlsbad and Aachen, the attack of gout was not repeated and the swellings had disappeared. The second case was that of a gentleman now 66 years old who had never lived very luxuriously and who moreover was not very fat. His weight seldom exceeded 150 pounds; he contracted syphilis 25 years ago and slight erosions still show themselves from time to time on the tongue but disappear on painting them with corrosive sublimate; 12 or 15 years ago he had slight attacks of podagra and painful nodules formed on the last joint of the finger. There were no acute attacks of gout in the last ten years but diabetes set in about four years ago, with suitable diet the urine remains free of sugar but has contained a small quantity of albumen for the last two years.

Supported by my experience of more than 350 cases I can assert that the simultaneous occurrence of gout and diabetes is not frequent, at least with us; I believe, however, that stout women are more liable to diabetes and stout men to gout although obesity is not a necessary factor in either of these diseases even though it is a frequent preliminary condition. These anomalies of metabolism are apparently of very different nature. Ebstein it is well known has recently taught that the diabetic from a defective constitution of his tissue protoplasm may produce less carbonic acid from an equal quantity of combustion materials than a healthy man.<sup>1</sup> He further asserts that the uric acid diathesis and a disposition to diabetes often occur together or alternately and that both arise during intra-uterine life. If Ebstein had always seen gout precede diabetes in these cases in which

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<sup>1</sup> Die Zuckerharnruhr, Wiesbaden 1887.

gout and diabetes occurred together, then the first of my cases shows it is not the general rule. Moreover it often appears not to be a true diabetes after gout but rather a transient glycosuria.<sup>†</sup>

With regard to the essential nature of gout Ebstein, who amongst modern clinical physicians has especially occupied himself with the origin of the diseases of metabolism, gives it as his opinion that the causes of arthritic gout are to be sought in the affected extremities themselves and indeed in the muscles and bones which produce uric acid in gout whilst this is but little if at all the case during normal metabolism. On the other hand Cantani thinks the excess of uric acid produced arises especially in the connective tissue and in the articular cartilages, whilst Charcot and Robson Roose ascribe a principal part to functional disturbances of the liver. Be that as it may, all recent observers are agreed (I will mention a dissentient opinion later) that uric acid is the *materia peccans* in gout, that it shows itself in excess in this disease and that the deposition of acid urate of soda in the joints, according to Ebstein after previous necrosis of the affected tissues, is the cause of gouty articular inflammations. The fundamental cause of the increased production of uric acid remains unexplained up to the present. It apparently depends on some inborn anomaly of metabolism which is connected with the imperfect transformation of albuminous material. There is therefore much in favour of the conception of a delayed metabolism. [Bouchard]. Though Germain Sée, according to Garrod, states on the contrary that birds who press the oxygen from their lungs into the cavities of their bones in great quantities yet produce uric acid and not urea, still this has no relation to human beings as birds produce uric acid in accordance with their peculiar organisation instead of urea. It seems to me more probable that the obesity so often associated with gout in man, as well as in fattened animals is very often connected with disproportionately small lungs and that gout only

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<sup>†</sup> See Ebstein, Diabetes, S. 166—167.

appears in spare, temperate living people when there is a very strong inherited predisposition. At the same time one cannot but ascribe a prominent place in the causation of gout to disturbances of digestion. Whether a functional disturbance of the liver (Charcot and Robson Roose) as a rule restrains the conversion of uric acid into urea I will not discuss here though I find no sufficient proof of it; the opinion of Senator<sup>1</sup> who allows the acids produced by disturbed gastric digestion to play an important part appears much clearer to me. For dyspepsia, flatulence, formation of acid, &c. have been generally observed to be frequent precursors of attacks of gout and the immoderate use of heavy food and drink has a prominent share in their pathogenesis. It may further be admitted that the attacks are caused by excess of acid in the blood which changes the simple urate of soda and deposits it as insoluble acid urate, (according to Ebstein the acid in the blood is produced in consequence of the necrosis of cartilage due to the influence of the uric acid). The onset of the attack is naturally favoured if the already functionally or organically weakened kidneys are not in a condition to free the blood of its excess of uric acid. As clinical experience shows, injuries, overfatigue and other influences which weaken the power of resistance favour the onset of the attack. Gout also readily attacks joints which have been weakened by previous disease. The extraordinary predilection of gout for the metatarsal joint of the great toe must be attributed partly to the circumstance that this joint has especially to bear the weight of the body and is exposed to many shocks in walking. Walking over rough uneven ground, as when shooting, considerably favours the onset of an attack of podagra as well as its return soon after its subsidence.

The diagnosis of gout is certainly not difficult especially if it is a regular acute attack which more frequently occurs in the form of podagra; the sudden onset, generally in the night, the violent pain on account of which the pressure of the bed clothes can

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<sup>1</sup> Vide Ziemssen, *Spez. Pathologie u. Therapie*, 13. Bd. 2. Aufl. S. 156.



scarcely be tolerated, the seat of pain with its redness and swelling have something extremely characteristic about them. On the other hand one not unfrequently finds that chronic cases of gout with inflammation of different joints have been mistaken for rheumatism and some cases of arthritis deformans especially in the early stage present a great similarity to gout. But the mode of onset, the constitution of the individual, the appearance of the swelling almost always leads to a correct diagnosis; the evidence of the deposition of urates especially in the helix and anthelix in the form of little nodules very often betray to the first glance the gouty character of the affection. If men in the better class of life with more or less luxurious surroundings are attacked by frequent inflammatory affections of the joints recurring with more or less regularity and which often disappear without leaving behind any bad results one must always entertain a suspicion of gout though no real attack of podagra has taken place and one is generally confirmed in this suspicion by a thorough examination of the case.

The prognosis in gout is not so unfavourable with proper diet and treatment. Many gouty patients, especially those who know the nature of their ailment and who have sufficient moral courage to lead a moderately careful life and who give up the excessive use of the luxuries of the table attain a great, nay even a very great age. The ancient Romans, amongst whom gout was of frequent occurrence (as it is still in Italy) especially during the period of increased luxury, went so far as to congratulate patients upon an attack of gout because they believed this wholesome derivative lengthened life; naturally this view was not in general correct but it had as we shall see a certain justification under some circumstances.

Amongst 44 gouty persons whom I knew, partly professionally and partly personally, in my immediate neighbourhood (Aachen and its surroundings) during the last five years, six died during that time at the ages of 83, 79, 75, 71, 70 and 69 respectively; of the 38 still living one is 84, another 79, a third 74 and 11 have already reached their 60th year. One sees from this that



gouty persons not unfrequently attain a great age and gout is perhaps one of those diseases in which we are justified in giving a favourable prognosis when there is a moderate use of the pleasures of the table, especially as regards spirituous drinks. But it is evident that the severe gouty alterations in the joints, the affections of the kidneys and the changes in the heart, great blood vessels and bronchiæ which accompany *arthritis urica* moreover the definitely proved arthritic changes in the central nervous system involve a naturally increased danger to life and health; certainly many cases of *angina pectoris* which so easily bring about a sudden end depend upon arthritic changes in the coronary arteries of the heart. As above mentioned, the complication of gout with syphilis, especially when alcoholism appears as a third factor, is extremely dangerous to the arterial though less so to the venous system. When a few years ago a celebrated investigator and author wrote to me on the subject of gout and stated that he had never seen a combination of gout and syphilis without a simultaneous abuse of alcohol I could not quite agree with him from my own experience. Amongst my cases in which gout and syphilis occurred together there were some in whom the abuse of alcohol could not be proved.

As we now pass to the treatment of gout I will chiefly speak from the standpoint of my own, not inconsiderable, experience and will first discuss the treatment of the gouty attack and then the gouty diathesis with special reference to the thermal methods.

In the acute attack, especially in podagra, rest to the affected part is the first thing to be attended to; the invalid must remain in the recumbent posture for the first few days, that is during the period of violent pain. As local treatment I recommend merely wrapping in cotton wool; all other local applications, frictions, tincture of iodine, leeches, ice, I consider superfluous or injurious. It is true that many patients feel relief from the application of leeches but in my opinion these can easily be dispensed with. During the early stage in which inflammation of the joint, fever

and violent pain predominate the administration of salicylate of soda is indicated, although I am far from assigning such an important rôle in gout to this remedy as Germain Sée amongst others does. Its real domain is in acute rheumatism and, in certain circumstances, in chronic rheumatic arthritis; but even in acute infectious rheumatism I cannot regard it as a real specific, as so many do, as it has a considerable effect in almost all diseases attended with fever and pain in the joints. Moreover in acute rheumatism it can be replaced to a certain extent by other equally effectual means, such as benzoate of soda, salol, antipyrin &c. I consider salicylate of soda to be a powerful remedy for fever and pain and I thus explain its remarkable influence in acute rheumatism; for the same reason it takes a high place in the treatment of the first stage of the attack of gout. It may be given during the first few days in hourly doses of 15 grains, best during the afternoon, for prolonged administration it is expedient to give it in a strong dose in the afternoon (about 75 grains) according to the method recommended by Brandis<sup>1</sup>. If the pains are very great and not to be allayed by salicylate of soda injections of morphia cannot be withheld. But when the attack becomes prolonged and passes from one joint to another one must have recourse to the administration of colchicum which though a much maligned remedy plays an important part in the hands of those who thoroughly understand gout. Whether the excretion of uric acid is favoured by this means, of which there is no proof, whether its formation is hindered, or in what way (perhaps by elimination through the intestinal mucous membrane) this remedy is in a position to alleviate and cut short the attack of gout, I leave undecided. One fact is certain that the use of the wine of colchicum or other similar preparation as well as certain secret remedies containing colchicum are recognised as useful by the patients. Amongst secret remedies the *Liqueur de Laville* has a prominent place and often enough I have been able to testify

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<sup>1</sup> Ueber die Behandlung des chron. Gelenkrheumatismus. Berlin, 1882, S. 23.

to its efficacy in attacks of gout occurring amongst visitors to the "cure" here who are accustomed to its use. The apothecary Mylius of Leipzig compounds a preparation called *Liq. Colch. composit.* which is a much cheaper substitute for the *Liqueur de Laville* and which according to his statement is distinguished by its containing a greater amount of anhydrous colchicin than our Vin. Sem. Colch. which often contains old, insoluble colchicin. I myself have had no opportunity of trying this preparation and have attained my favourable results in the treatment of attacks of gout with our Vin. Sem. Colch. given in doses of 25, 30 and 40 drops three or four times daily. Naturally if diarrhoea or vomiting occurs it must be stopped; under certain circumstances a small quantity of Tr. Opii may be added to the Vin. Colch. I have also several times added extract of aconite in the proportion of 1 in 100. It is almost unnecessary to state that the diet must be limited and before all must correspond to the character of the fever.

As regards the treatment of the arthritic dyscrasia a suitable diet is most important, especially moderation in eating and drinking. The diet must be a mixed one consisting chiefly of meat, vegetables, and fruit. Farinaceous and saccharine substances must be avoided as much as possible, as they tend to the formation of fat. Fat [itself may be allowed in moderate quantity (Ebstein). As regards drinking, it depends rather on the quantity than on the quality. A very moderate quantity of beer may be allowed, as according to the researches of Mooren after the use of Dortmund beer the urine contained less acid than after the use of wine. Mooren found the ordinary Moselle wine most hurtful, the finer Moselles and Bordeaux were better, but good Rhine wine was best. Mooren quotes many well known cases of episcleritis from gout<sup>1</sup> and I know a lady who was affected by several attacks of this disease and in whose family gout played an important part. Perhaps the best drink for gouty patients is good

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<sup>1</sup> Fünf Lustren ophthalmologischer Wirksamkeit, Wiesbaden, 1882, S. 121.

red wine mixed with water, the *eau rouge* of the French. The exclusion of acids from the diet of gouty patients is very important. For the rest I refer to Ebsteins excellent work "Das Regimen bei der Gicht", Wiesbaden 1885.

Even if it should be admitted that the general regimen, moderation in eating and drinking, sufficient exercise, and the avoidance of excessive nervous excitement play a very important part in the treatment of gout, there is still a great deal to be done in order to limit the frequency and violence of the attacks. Indeed, it is not at all impossible to dissolve the deposited exudation. The thermal treatment and especially the alkaline waters, are very valuable for this purpose and I may here refer to the results of the thermal treatment of gout which I published in 1884<sup>1</sup> as my recent experience had confirmed my earlier observations and in some respects in a striking manner. In a great number of the cases treated here the frequency and violence of the seizures was diminished to such a degree that patients who formerly had several attacks every year, in the year after the "cure" they had either only a very slight attack or no attack at all. In several cases the attacks which had formerly been frequent were entirely absent for several years: the softer exudations in the joints, and in sheaths of tendons and muscles were gradually at least partly reabsorbed.

On the mode of administration of this cure in 1884 I expressed myself as follows:—"The cure consists in the internal administration of the thermal waters in doses of 3 to 4, or 5 to 6 glasses of 250 grammes each daily; in many cases I added to the first and last three or four grains of carbonate of lithia. The thermal douche was also employed in such a manner that a douche of a quarter of an hour's duration generally followed a bath of the same length of time at 28—29° R. after which the patient went to bed for an hour or an hour and a half. The douche used many times daily or alternately with simple baths forms the staple of the bath "cure"; for a close observation of the

<sup>1</sup> Loc. cit.



cases makes it clear to me that the chief part of the effect of our "cure" in gout must come from the douches.

It is not difficult to find the theoretical reason of these remarkable effects whereby the results attained here in a great number of cases surpass those at Karlsbad and Wiesbaden. After Garrod had proved the action of uric acid in gout, Cantani and Senator more accurately described arthritis urica as a metabolic disease, but above all since the excellent researches of Ebstein have more clearly defined the pathologico-anatomical and chemical action of uric acid on the organs and especially on the joints, a thermal cure must appear theoretically useful if it is in a position to exercise a real effect on increased formation of uric acid and causes excretion of the surplus quantity.

Now my colleague Dr. Beissel has stated in his *Balneological Studies on the thermal springs of Aachen and Burtscheid* that an increase in the amount of uric acid excreted from 0.91 to 1.20 is produced by the vapour baths of Aachen, moreover by drinking 1200cc. of the Aachen thermal water the average increase is from 0.64 to 1.21 or 1.25 resulted. In his article collaborated with me he further shows that by the use of the Aachen douche combined with massage which is followed by an immersion bath of fifteen minutes the amount of uric acid daily excreted rises from 0.87 on the average of three days to 1.91 on the three days on which the douche was taken; on the three days following the douche the average excretion was 1.01. From this we have evidence that a three or four weeks course at the Aachen waters during which from 3 to 5 or even 6 glasses of 250 grammes each are drunk and from four to six douches are taken each week not only essentially increases the excretion of uric acid from the organism, but also through the direct influence of the douche and massage on the place of formation of the uric acid and its excretion, especially in the joints must have an essential influence on the processes of the disease and its residue.—I still consider the foregoing words taken from my article hold good, though Emil Pfeiffer of Wiesbaden in his article "Harnsäureausscheidung und



Harnsäurelösung" has pointed to his own and the researches of Posner and Goldenberg on the influence of the urine after the consumption of different mineral waters and on the solution of uric acid and has put forward a theory which differs considerably from that obtaining at the present time. He found that the urine of gouty patients contained uric acid "in a free state" which, therefore, was more easily separable than in the urine of healthy persons in whom this acid usually exists in a state of combination with acid urate of soda. Pfeiffer finds in this circumstance grounds for a new theory of gout in which he declares that an abnormally large separation of uric acid takes place also in the fluids of the body in gouty people. At the same time Pfeiffer considers that neither in gout nor in uric acid calculi excessive quantities of uric acid are formed, but that the formation of uric acid and its excretion is considerably *diminished*. Nevertheless the researches of Pfeiffer only prove that the urine of gouty and calculous patients contains too much or only free uric acid during the period between the attacks. If it is correct, as the earlier observers have already shown, that the urine in chronic gout contains on the whole less uric acid than in health, it by no means proves that there is a diminished *formation* of it in gout; on the contrary we find much more uric acid than in the normal blood, and from his therapeutical remarks on the Fachingen Waters and the acid phosphate of soda one sees that Pfeiffer also believes there is an increased excretion of uric acid in his gouty cases. Accordingly as Liebreich, remarked in the discussion on the report, nothing is changed in the therapeutics of gout by the new investigations and conclusions.

As already remarked I have in many cases during the use of the Aachen thermal cure added 0.15 to 0.2, sometimes even 0.25 grammes of carbonate of lithia to the first and last glasses of our thermal water; by this means more lithia is brought in contact with the tissues than by the use of the natural lithia waters. Of these the Salzschlierf (Bonifaciusbrunnen) contains 0.21 of chloride of lithia in a liter, but in an not easily soluble state, Assmanshausen contains 0.028, the Kronenquelle at Salzbrunn only 0.011. The

artificial lithia waters are stronger, of which the strong Ewich contains 1.0 and the weak 0.5 of bicarbonate of lithia in a liter; the artificial lithia water of Struve contains according to Ebstein<sup>1</sup> as much as 2.0 in a liter and may be taken only in small quantities.

In very many cases I have recommended patients at the conclusion of their course to drink for two or three months, twice daily 0.15 to 0.2 of carbonate of lithia in ærated water at the same time using a suitable diet. I have not seen any injurious effects on the constitution from this treatment although I have had often enough the opportunity of observing the patients. In Aachen the use of preparations of lithia is so favoured by the patients that they use this means of treatment without medical advice and not unfrequently in large doses taken on the point of a knife which is certainly to be strongly condemned. I have also for a time given the so-called Cantani Powder—Nat. Carb. 0.5, Pot. Cit. 1.0 Lith. Carb. Effervesc. 0.25 twice daily, but preferably have employed lithia alone. However, long before Cantani, Garrod<sup>2</sup> ordered the salts of lithia combined with carbonate or citrate of potash in water containing carbonic acid. The excellent researches of Pfeiffer<sup>3</sup> as well as those of Posner and Goldenberg<sup>4</sup> have proved that the urine after the use of the mineral waters of Vals and Vichy and after those of Passugg and Fachingen has the greatest power of dissolving uric acid: The Wiesbaden and still more the thermal springs of Karlsbad (Mühlbrunn) also lend the urine the property of dissolving uric acid though only during the time in which they are employed. (See also appendix.)

The rules I have given above for the use of the bath cure here, especially the douche bath combined with massage naturally refer to the period between the attacks and I accordingly advise

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<sup>1</sup> Harnsteine, S. 267.

<sup>2</sup> Natur und Behandlung der Gicht, übersetzt von Eisenmann, Würzburg. 1861, S. 293.

<sup>3</sup> Verhandlungen des 5. Wiesbadener Congresses, S. 444 ff.

<sup>4</sup> Zeitschrift für Klin. Medizin. Bd. 13, Heft 6.

my patients to come as far as possible in the free intervals and not too soon after the attack. During the actual acute stage of gout according to my experience baths are to be entirely forbidden or are at least superfluous; but after the acute attack has passed over and fever is no longer present, but the patient still suffers from stiffness and swelling of the joints and walks with difficulty the bath cure may be begun if necessary. At first only simple baths and drinking the thermal waters should be resorted to, later on when the sensibility of the joints is diminished the douche may be used with care. I cannot agree with the advice given by Pfeiffer<sup>1</sup> that a podagra patient should walk as soon as he can drag himself along; a return of the trouble may easily be brought about by too early exercise and accordingly I advise my patients to come here if possible, not too soon, but at least after the termination of the acute stage. According to Pfeiffer<sup>2</sup> gouty patients attain a condition almost equivalent to healthy by means of the "cure" at Wiesbaden, yet I may say, especially with regard to those cases in which deposits still remain in the joints, that in general the douche is not employed in Wiesbaden as energetically as in Aachen. As regards the thermal cure in Karlsbad it is in the first place employed against what many authors consider the root of gout, namely: the excessive formation of acid in the stomach, the congestion of the liver is by this means reduced in an effectual way and the formation of free uric acid is thereby probably diminished. As far as I have been able to ascertain from the literature of the subject no sufficient investigations have been made concerning increased elimination of uric acid by the Karlsbad waters. The works of Dr. J. Mayer<sup>3</sup> as well as those of London<sup>4</sup> deal chiefly with the excretion of nitrogen. That the urine after the use of the Karlsbad-Mühlbrunn according to Pfeiffer has a greater power of dissolving uric acid than after the use of

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<sup>1</sup> Die Heilquellen des Taunus, Wiesbaden, 1887, S. 41.

<sup>2</sup> Loe. cit. S. 48.

<sup>3</sup> Zeitschr. für klin. Medizin 3. Bd. S. 82.

<sup>4</sup> Ibid. 13. Bd. S. 48.

the Wiesbaden Kochbrunnen I have already mentioned. In any case the "cure" at Karlsbad will retain its power against gout, especially when there is catarrh of the stomach, congestion of the liver and a tendency to obesity. The Wiesbaden waters recommend themselves for accelerating the general metabolism and for lixiviating the tissues, but the Aachen cure in my opinion should be placed in the first rank in the greatest number of those cases which are distinguished by the frequent occurrence of gouty inflammation of the joints with or without persisting stiffness as well as where there are exudations in the joints and sheaths of tendons.

#### APPENDIX.

I take the following from a work not yet published which my colleague Dr. Beissel has kindly placed at my disposal.

1. The pure Aachen thermal water dissolves an important quantity of uric acid, namely 0.4710 grammes in one liter at 15° R.

2. The urine of a healthy man which after drinking a liter of the Aachen thermal water contains 0.162 of uric acid in 1000 cc. dissolves from the uric acid filter a further quantity of 0.149 of uric acid.

3. Very dilute normal urine which contains only 0.181 grammes of uric acid after filtering through pure uric acid may still yield a certain amount. It contains after this process 0.0092 per liter, that is nearly half the entire quantity, as „free uric acid.” The occurrence of separable uric acid in the urine is therefore by no means peculiar in gout and lithiasis.

4. Urine passed shortly after an attack of gout which contains 0.835 of uric acid gave up 0.093 on the uric acid filter and still contained 0.742 and it therefore behaves in a manner not essentially different from healthy urine.

5. Investigations in the case of a patient affected with uric acid concretions show that after the application of the Aachen thermal douche the excretion of uric acid rose from 1.2 to 2.0 in twenty-four hours.



These thoroughly established facts show that after the use of the Aachen thermal waters the urine acquires an important power of dissolving uric acid and not only, as already proved in that of healthy people, but also in the case of gouty patients the excretion of uric acid in the urine is considerably increased after our douches, while on the other hand the assertion of Pfeiffer that the greater excretion of uric acid is characteristic of gouty and calculous patients appears to be doubtful.

To illustrate these statements I will briefly mention three of my cases.

1. Herr C. a german merchant living in Belgium accustomed to a luxurious life and now 64 years old suffered for 18 years from gout which occurred during the first two years in violent repeated attacks beginning in the great toe and spreading itself over the different joints. In the years 1872, -3, and -4 he made use of the cure here with the result that the attacks remained absent until 1877 although he had not used the cure during the previous three years. Since then the patient came regularly every year for treatment which consisted of daily douches, thermal water to drink and lithia. He did not limit himself in his diet in spite of all my warnings but continued to be a great lover of the pleasures of the table. His weight was about 200 pounds. In spite of this only three attacks took place since 1877. One attack which followed a serious bronchitis was very severe, the other two were very slight making, in sixteen years, only four attacks, three of which were very slight. The result would have been better had his manner of life been more careful; the treatment itself suited him exceedingly.

2. Herr O. Belgian, aged fifty, suffered for about ten years from very violent and repeated attacks of gout beginning chiefly in the great toe, but spreading over all his joints, in consequence of which considerable stiffness was present. When the patient came here for the first time in 1880, deposits and nodules in the ears clearly indicated the gouty character of the affection. His maternal grandfather had been gouty. The patient himself had

many troubles with a very numerous family. Since 1880 he came every year for a cure of about three weeks; a serious attack took place only once after he began this treatment, since 1881 the patient has been so free from the attacks that he does not require to keep lying down any longer and only now and then slight symptoms show themselves in the great toe; the stiffness has completely disappeared; the patient can attend to his business uninterruptedly.

3. Herr S. a german merchant settled in England came here in July 1884 for the first time for the cure. He had suffered exceedingly from gout for ten years the attacks generally occurring twice a year and compelled the patient to lie up for many weeks at a time. Cures in Karlsbad, Bertrich and Wildbad had been without any special effect; the attacks which had occurred only once in eighteen months appeared more frequently and more violent in recent years. Transient albuminuria had appeared once. In other respects the patient was well and strong and led a temperate life. His weight was 153 pounds. In the last few months he had lost 10 pounds in weight which was perhaps owing to the circumstance that he had taken for some years half a teaspoonful of carbonate of potash twice daily. He carried out a cure of twenty douches and three baths and took lithia for three months afterwards. In the following year he had no attack. On the 15 July he began a second cure. His weight was 170 pounds. During the cure there was a passing „warning” in the great toe. In the following year he had an attack lasting one day.

On the 26 July 1886 he began a third cure. In the following year Herr S. did not require to remain at home any day, although he was less careful than formerly. A slight warning showed itself only twice. He considered himself lucky to have been almost free from attacks for three years while previously he had been obliged to lie up for some time every year. Since then he has had no further attack; he repeated the cure in 1887 and 1888; during the cure of 1887 only a slight transient swelling of the joints of the great toe showed itself.

II.

CHRONIC RHEUMATIC ARTHRITIS.

BY

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GEHEIMER SANITÄTSRAT.







**B**EFORE entering on an account of this important disease we must state that, bearing in mind the object of this book, we shall confine our remarks to the relations of this affection to the Aachen cure. We do not consider it any part of our present task to bring into the discussion the voluminous literature on the subject nor the manifold opinions on the nature of the complaint.

From the details of the observations made on our patients the affection we understand by the name of chronic rheumatic arthritis can easily be recognised. As regards the course of the malady our cases divide themselves into two groups. In the first group the disease comes on in the form of attacks accompanied with fever of various duration, often lasting several weeks. These attacks frequently resemble those of acute rheumatism, but without any tendency to heart disease. Moreover, a complete cure does not take place and every fresh attack leaves behind new products of disease which impair the general condition.

The cases in the other group are characterised by a slow and creeping course of the disease which gradually and almost imperceptibly cripples the joints.

Those cases are also to be separately classed in which the joints are attacked one after another until there is not a single joint free from the disease, from those in which only one joint is affected as for instance the shoulder or hip. The changes in the

diseased joints show that every conceivable form of the disease occurs in the parts affected. Swelling through exudation, thickening of the synovial membrane, displacements of the ends of the bones, firm contractions in consequence of the shrinking of tendons and ligaments, also partial and complete dislocations, all these changes have been observed and lead gradually to complete uselessness of the limbs.

With regard to the etiology our experience leads to two important points which differ considerably from each other. In both we will content ourselves with establishing the sequence of cause and effect in accordance with the facts. We must therefore forego the detailed examination of the *implicated joints* as a vain attempt.

The first point to be considered is the influence of the climate in which our bath visitors have lived and which apparently is the cause of their complaint. It is very striking that most of them come from districts which lie in the neighbourhood of great surfaces of water or which are surrounded by similar expanses. The coasts and river basins of Germany, Holland, Belgium, Great Britain, Denmark, Sweden, Norway and Finland send us the greatest number of cases. Dampness of the ground and air in conjunction with a comparatively low temperature appear to favour the onset of chronic rheumatic arthritis. This view finds confirmation in the fact that the condition of many of the patients coming here is improved by the change of climate alone, of which we will speak later.

The second etiological point which we have to consider as regards our patients is of quite another sort—we mean gonorrhoeal infection. It is very remarkable with what heat the connection between gonorrhoea and rheumatism has been discussed and one follows with interest the part which the gonococcus has played therein. When the discovery of these organisms in the diseased joints suddenly appeared to light up the darkness, doubt soon followed and the whole question was silently allowed to drop and observers remained content with the results of clinical investigation.

We will take care not to approach the difficult question how and why the gonorrhoeal virus is able to produce the disease in the joints and will pass on to the simple description of what we have seen in our patients.

It is a fact that a considerable number of men and especially young men, come here for treatment suffering from chronic rheumatic arthritis combined with gonorrhoea and in whom the etiological connection of both diseases is so much more striking when the rheumatism recurs once or even more frequently with every fresh attack of gonorrhoea. It is easily understood that the chronic form prevails more amongst patients coming from a distance; whilst the more acute inflammation of the joints with purulent exudation is observed amongst the other patients here, as has been described at various times by distinguished authors. The cases observed here amongst our bath patients do not differ essentially in their other symptoms from ordinary chronic rheumatic arthritis. As in the latter affection many joints are affected and they are attacked in different ways so that they are altered as regards their form and functions. This form is remarkable for its obstinacy and the duration of the disease is to be reckoned by months at least three or four months. A peculiarity which we do not find described elsewhere, but which we have observed too frequently to pass over in silence consists in the painfulness of certain spongy bones, especially the *os calcis* occasionally the ilium and the pain is indeed felt in parts of the bone at a distance from the joints, and is severe enough to prevent walking. There is another very important point which is characterised by special sensibility to pressure, such as the under surface of the heads of the metatarsal bones where these come in contact with the corresponding phalanx. We have had sufficient opportunity of convincing ourselves that in this form of chronic rheumatic arthritis the affection of the joint and of the portion attacked may frequently change. We have even seen the above mentioned sensibility of the *os calcis* considerably diminishing and this on being followed by swelling and increased pain in one of the joints previously affected. Moreover during the entire

course of the disease the affection of one of the diseased joints never disappears suddenly and completely. A cure takes place always very slowly and gradually and those joints which have been longest and most severely affected may retain contractions and swellings for a very long time after the disease has been considered to have run its course—quite sufficient traces of the passage of the disease.

The greater number of the cases we have seen were finally cured, but we must admit that their cure was favoured in the highest degree by various circumstances. These patients were for the most part young men who were prevented from exercising their professions and who could scarcely be otherwise than faithful in carrying out the treatment, the success of which was of the greatest importance to them in their situation in life. It is a well known fact, and one which has been observed by us that chronic rheumatic arthritis dependent on gonorrhoea may last for many months longer than the gonorrhoea. Neither the degree or the situation nor the medicinal treatment has had any permanent influence in our cases in the duration of the affection of the joints from its first commencement. Injections were as well born during the continuation of the discharge, as internal medicines and both had the same effect as usual. But that copaiva, cubebs or sandal oil has made even the slightest impression on the joint affection we have not been able to confirm in any instance. On the other hand we must here mention that we have always experienced the same results from the ordinary anti-rheumatic measures as in other cases of chronic rheumatic arthritis—a circumstance which other observers have not recognised.

#### TREATMENT OF CHRONIC RHEUMATIC ARTHRITIS.

Of the various means available for this purpose we will take first our thermæ.

Three or four glasses of thermal water are drunk fasting in the course of an hour—if possible in the intervals of a walk, as



the experience of the older physicians holds good to-day, that movement in the open air favours the cure of chronic rheumatic arthritis. Those who cannot walk must be rolled in a chair or if that is not possible the water must be drunk in bed.

The best time for bathing is about an hour after breakfast as the bath taken fasting does not suit many patients on account of the easily occurring faintness which often follows it. As long as the pain in the joints prevents rapid movement the patients must content themselves with simple thermal baths, but as soon as extreme sensibility has subsided, douches may be ordered—either daily or alternately with simple baths. The streams of water directed on the suffering part in the douche, the power of which can be regulated as required, must be of the same temperature as that of the bath i. e.  $28^{\circ}$  or  $29^{\circ}$  R. The douches are combined with rubbing and kneading of the affected parts so that the entire process somewhat resembles a wet massage. The douches last 10 or 20 minutes after which the patient sits in the bath for about the same length of time. The greater number of the patients find that they can support this treatment best, although occasionally profuse perspiration may be induced in suitable cases. In cases of this kind the thermal vapour bath is properly employed. The patient is placed in an enclosed compartment above the thermal vapours to the influence of which he is exposed for 15 minutes and is then placed in a previously heated bed for half an hour. The entire process is generally ended by a immersion bath taken for a short time.

Whether the patient should have rest or exercise after the bath depends on his condition and the state of the weather.

Of the number of medicines which may be tried in conjunction with the "cure" we will mention only two, salicylate of soda and iodide of potassium. Neither of these drugs can be spared in the treatment of chronic rheumatic arthritis, but the first is by far the more important and since the experience acquired at Aachen is highly in favour of its efficacy in this affection, we will say something about it before proceeding further. We have employed

this drug to a great extent during the last ten years and feel justified in stating that it acts as a true specific in this disease as well as in acute rheumatism, that is to say, that its curative effect becomes manifest almost after every fresh dose. We may mention in passing von den Heyden's preparation which leaves nothing to be desired in purity and of this we prescribe only a single daily dose or strictly speaking an evening dose which seldom exceeds 5 grammes, (75 grains). One must begin with small doses so as not to produce any alarming symptoms and gradually pass to the full quantity in three or four days and this may be continued as long as may be deemed necessary.

As this remedy has certain unpleasant collateral effects whereby so many allow themselves to be frightened and thereby forfeit a principal condition of their cure, we must therefore say a few words on this point. Buzzing in the ears, copious perspiration and nausea are the troublesome symptoms which oppose the use of this excellent remedy. The buzzing in the ears is comparatively easy to bear, and is readily overcome according to our method by sleep. The deafness continues, it is true, some part of the following day and in many may attain a very unpleasant degree, yet one can readily convince one's self by regularly testing the hearing that it returns in spite of the continued administration of the remedy. The careful registration of the increase and diminution of the hearing serves to tranquillize the patient and must be especially recommended during the first stage of the "cure". The perspiration is usually the least troublesome effect; it is often considered wholesome by the patients and indeed now and again appears to have a favourable effect on the treatment, but it gradually disappears and gives place to diuresis. The most annoying symptom is the aversion, the more as it keeps up all the time the feeling of the possible injuriousness of the remedy, but only in very rare cases it is quite insuperable. The firm conviction of the wholesomeness and indispensibility of the drug helps very much to allay vomiting; moreover good example, community of suffering with others

as well as the hope of succeeding in the end give great assistance.

It is scarcely necessary to employ means to improve the taste of the medicine, every one takes what suits himself best and as he must take the remedy for a long time leisure and opportunity are not wanting to find out the nicest way to disguise the taste. The greater number come finally to the simple plan of swallowing the drug dissolved in water with a gulp as quickly as possible. In some cases, however, there remains only the injection per rectum which on account of the solubility of the salicylate of soda is a very simple process and is carried out by means of a small well made syringe with a blunt nozzle holding half an ounce of fluid.

Other unpleasant symptoms due to a sort of idiosyncrasy: such as fever or more or less spread ecchymosis, as well as watery transudations in the connective tissue or in the pleurae have not come under our notice in recent years—perhaps in consequence of more perfect purity of the preparation.

We have never been able to share the fear of exciting congestion of the kidneys and albuminuria. Numerous analyses of urine in the course of many years have led us to the conviction that those apprehensions entertained by others have depended upon mere chance experiences.

We wish to call attention to one particular — namely: that after using the drug for a long time the body becomes accustomed to it whereby its remedial power is somewhat weakened. In consequence of this, which one finds with nearly every remedy after prolonged use, it is necessary to pause for a time in the administration. For, on account of the long duration of the disease, salicylate of soda, if one is at all to expect a cure, must be prescribed for many months, at least far beyond the period during which the Aachen bathcure is employed. The baths, however, are certainly best continued until there is complete recovery, yet if this is not possible the patient, after fulfilling the directions given here, even for a short time, may be

informed of those means which may be useful to him in the future so as to complete his cure.

Though in the treatment of chronic rheumatic arthritis iodide of potassium, as already mentioned, is by no means equal to salicylate of soda, still it may often be of very great use for a certain time. As far as our experience goes it has undoubtedly a good though somewhat transitory effect, where the salicylate of soda has to be discontinued for any cause, especially where any new painful places show themselves through toleration of the drug becoming established; these quickly disappear after using 10 to 20 grains of iodide of potassium twice daily for eight or ten days. We have an impression that this favourable influence of iodide of potassium was exerted in cases which were connected with gonorrhoea without syphilis having been in question.

We have intentionally not mentioned most of the other remedies used for chronic rheumatic arthritis because according to our experience, neither new ones such as salol, antipyrin, antifebrin or resorcin, nor old ones such as lithia and citric acid have gained a reputation for certain and unfailing success. We might perhaps not have set colchicum entirely aside and devoted some lines to it, if only in grateful memory of the period before the discovery of salicylate of soda, when it rendered powerful services to our patients. With the long duration of this disease colchicum may not be employed on account of its toxic properties and in cases developing themselves with symptoms of fever it is not at all so efficacious as salicylate of soda. Colchicum is without doubt the specific for typical gout in which salicylate of soda is of comparatively little value. At the same time in doubtful cases the greater effect of one or the other remedy may be of diagnostic importance.

Besides the thermal treatment in connection with these remedies, the climate of Aachen has an extraordinary effect on the cure of chronic rheumatic arthritis. At least we can ascribe to no other circumstance the fact that rheumatic patients who come to Aachen from damp districts very often in a few days after their arrival



before treatment could have any effect found a considerable improvement in their condition. Moreover the beneficial influence of this place is seen in those patients who from any cause are obliged to remain here for a longer time, whilst on the other hand the sad experience presents itself that the advantages gained here are often lost if the patient seeks his home too soon. Geographically Aachen is most favourably placed in comparison with the countries mentioned above as the ground as well as the air are to some extent of a totally different character. There are no great expanses of water around Aachen which lies in a wide crater protected by a circle of hills the summits of which lie several kilometres distant. The town itself is divided by several slight elevations so that there is consequently an ascent and descent in most of the streets. The rainfall runs off quickly and the streets and roads dry much sooner than in level places. It is well known that in consequence of these circumstances the climate of Aachen is very mild, for example the lowest temperature is always several degrees higher than that of the Rhine plains wherefore Aachen is well situated as a central resort for those suffering from chronic rheumatic arthritis—a point upon which we must lay special stress, supported as we are by a number of striking cases—even at the risk of reproach. The patients who are severely attacked always find themselves well if for any reason they are obliged to spend several months in Aachen. This condition being granted an excellent recovery may be promised to them with great certainty. In connection with this point the experience acquired in the case of those patients whose crippled state renders surgical measures necessary is of high interest. These patients, influenced by the favourable effects of the “cure” here, not infrequently decide to make one more attempt to regain, their long denied independence of others. Most important of all is the stretching of the contracted joints—preferably of the knee, but also of the hip joint, in consequence of which a complete revolution in the otherwise sad and helpless condition of these patients is effected.

As chance has brought many such cases in the course of time



under our notice we may be permitted to communicate our experiences. We have always performed stretching and extension under deep chloroform narcosis, in both extremities generally at one examination. In these cases we usually employ a slow working traction apparatus and have endeavoured by this means to make the extension as complete as possible. We have then applied a well fitted plaster bandage which divides the pressure and keeps it as far as possible from the affected part as for instance the knee. After a perfectly successful extension whereby all angularity is removed and the portions of the limb both above and below the joint lie level with one another, the resulting pain is not severe and if necessary a morphia injection will make it tolerable. But we must call attention to the fact that other manifestations of pain deserve the most careful attention and we have often soon after the operation split the plaster bandage open from top to bottom with hammer and chisel to relieve the limb from any pressure. The first attempts at walking may be made in about three or four weeks after the operation. A favourable effect is soon made manifest in the general health of the patient as well as in the condition of the other joints which show daily increasing power of independent mobility, after they had become apparently ankylosed by years passed in a bath chair.

Another very beneficial surgical operation is the removal of fluid exudations in the joints by means of a fine trocar and a suction or injection apparatus, an operation which with careful attention to anti-sepsis is painless and free from danger.

We leave in more experienced hands the account of what electro-therapeutics and massage can do for those bath visitors who suffer from chronic rheumatic arthritis.

We conclude in hoping that we have furnished a proof that in the combination and correct application of the means of treatment available in Aachen we possess a powerful aid against one of the most obstinate diseases and that we are in a position, even in apparently the most hopeless cases, to free our patients from their helplessness and to make life again enjoyable.

III.

ARTHRITIS DEFORMANS.

BY

J. RADEMAKER, M.D.





**A**RTHRITIS deformans, first recognised as a special affection and most carefully examined as to its pathological changes especially by german investigators: Virchow, Volkmann and others for a long time has not received the attention as regards its treatment which so severe and long lasting an affection should demand. The discovery of the peculiar connection between this peripheral affection of the joints and diseases of the central nervous system turned renewed attention to it and thereby furnished new indications for successful treatment.

Under the names of *arthritis nodosa*, *multiple chronic rheumatic arthritis*, *polyarthritis* (Hüter) I understand according to Senator, a disturbance of nutrition dependent upon a chronic inflammatory process in all the parts forming a joint, but not tending to suppurate, whereby, partly through abnormal proliferation and partly through atrophy, complete distortion of the joint ultimately results.

According to the careful statements of Virchow<sup>1</sup> we know that there are certain changes which proceed from the cartilage, next the synovial membrane becomes involved, then the adjacent layers of periosteum meet and finally the ligaments to a great extent become involved in the cycle of degeneration. Therefore I do not include under the term arthritis nodosa the chronic rheumatic joint affections which sometimes develop from acute forms of the

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<sup>1</sup> Berl. Klin. Woch. 1886 No. 49.



same affection which by the irregular participation of one or many joints and with a prolonged course may present appearances like those seen in arthritis.

After arthritis had been regarded as a pure joint affection for a long time and considered only from this point of view Remak in 1858 first described arthritis nodosa dependent upon primary disease of the spinal cord and of the sympathetic in the neck as *arthritis myelitica*, or *myelitico-neurotica*. This view was soon shared by Benedict. To those opinions founded on clinical results Charcot's pathological investigations brought new and striking support from the atrophy of the large ganglion cells in the anterior columns, or swelling of the spinal ganglia in neuropathic joint affections of tabetic patients (1868) analogous to arthritis. The objection to a mechanical origin favoured by a neuropathic basis is weakened by Charcot's argument. In true arthritis nodosa pathological proofs of a nervous cause are wanting, but clinical observation urges the acceptance of such an origin. The symmetrical occurrence and course of the disease is rightly urged as due to a common central cause and therefore the situation of the affection in the joints is to be regarded as the result of chronic irritative changes in the ganglion cells of the anterior columns.

The physiological proof of the existence of trophic nerves presiding over the joints has not yet been given; but from pathological data, as Eulenberg<sup>1</sup> says, it is very probable that in the large mixed nerve trunks of the extremities trophic nerve fibres of the joints and bones are included and that these enter into the spinal cord with the anterior nerve roots. They appear, like muscular trophic nerves to pass through the anterior columns and to become connected with multipolar ganglion cells in the anterior cornua.

Clinical observation urges us to accept a deep general disturbance of nutrition as the foundation of this peculiar joint disease. Besides the specially prominent symptoms of the disease other

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<sup>1</sup> Nervenkrankheiten.

trophic disturbances show themselves: irregularities in the formation of the nails, remarkable brittleness when cut, and sometimes complete degeneration or even shedding *en masse*. There are also disturbances of the functions of the hands and of the skin of the body generally; in severe cases there is complete arrest of the perspiration which returns only when improvement takes place in the original disease; finally there is a tendency to the formation of rhagades and fissures in the palms of the hands. The deep disturbances of nutrition are frequently associated with vaso-motor changes; continued dry heat and burning in various parts of the body, at times in distinctly defined spots, alternating with an acute sensation of cold and a feeling of numbness. At the same time the attention of the patient himself is attracted to the unusual swelling of the vessels of the skin. Corresponding to the vaso-motor disturbances in the hands these patients at the same time complain of congestion of the head and of frequently recurring megrim. A peculiar symptom is the simultaneous disturbance of sensibility, formication and itching in the finger tips such as we see in diseases of the sympathetic in women.—I have carefully investigated these trophic and vaso-motor disturbances and I have been able to ascertain their occurrence both at the beginning and during the course of the disease at a time when the real joint disturbances were very slight. Moreover the character of the pains in arthritis is such that they cannot be described as wholly dependent on the diseased joints. They are sudden and boring, limited to the joint and its immediate neighbourhood, there are also shooting pains following the course of the extremities or limited to the area of distribution of certain nerves which are often modified by conditions of temperature.

It is not within the scope of this little sketch to enumerate the entire series of symptoms of arthritis; I would draw attention to two symptoms which belong to the first stage of the disease and which are dependent on the nervous origin: the extraordinary motor weakness in the affected limbs and the early tendency of the diseased limbs to assume a bent position and

especially that of the fingers to the so called *main en griffe*. In far advanced degeneration of the joint and corresponding atrophy of the muscles which control it the slight force which is required to produce dislocations is easily explained; but it is certainly surprising that we observe a loss of motor power at the very beginning of the disease when the affected joints are swollen and painful only to a slight degree and when the muscles present no sign of change; it is the same as regards the bent or claw position of the fingers. The cause of this symptom can be only a central nervous one, modified indeed as Hunter taught by influences proceeding from the joints. As Charcot states in his new lectures, the irritation of the nerves of the joints passes to the centres in the spinal cord which on their part again reflects this irritation by means of the motor nerves to the muscles both to the flexors and extensors of the joints. The preponderance of the flexors over the extensors, produces the bent position—in the further course of the disease we observe the formation of manifold contractions the development and exact nature of which are described by Charcot in the clearest manner.

The symptoms of advanced arthritis are sufficiently known; but I lay stress on the central nervous nature of the disease and especially on the early symptoms because the treatment founded on this view is very successful and because treatment commenced in the earliest stage of the disease is attended with the best results.

In addition to arthritis nodosa, on account of the similar pathological circumstances there is also in contradistinction to the multiple or polyarticular form of the disease the monarticular form which attacks a single joint. Occurring in advanced age often without cause it is usually the result of injuries from which the joint or its connections have suffered. At the same time the violence of the resulting disease is not always proportional to the severity of the originating circumstances; I have not unfrequently observed severe forms of arthritis in consequence of apparently slight contusions or distortions of the joint.

Amongst the great number of severe ailments treated here I find only two serious cases of arthritis occurring in girls under 20 years of age the cause of which could not be ascertained; a greater number between 30 and 40, but most of the patients were over 40 years of age. The female sex was far more frequently affected. In a great number of women I am compelled to think the disease attributable to too frequent child bearing combined with severe flooding. In one case of severe multiple rheumatism with deformity, since every other cause was wanting, I could seek the originating impulse only in some precious severe psychical influence. Depressing psychical influences have also a very unfavourable effect on the course of the disease. Amongst the patients belonging to the poorer class in most cases unwholesome, damp dwellings were the foundation of the trouble. I also observed in one very severe case in which after a long sojourn and treatment in a favourable climate great improvement was attained, but after returning home to a damp district and a house surrounded by water, in spite of the best care there was a speedy and aggravated recurrence of the disease.

The restoration of the general health must be at first the foundation of treatment. Trousseau indeed declared that in order to attain any results from treatment one must not lose sight of the general nourishment and its effect in altering the mental attitude of the patient, and he considered that by improved diet it is possible that a process of absorption may take place in the cartilages and synovial membrane. The food must be strengthening, but on account of the frequently diminished powers of movement it must be capable of easy digestion. I lay great stress on a regular and abundant supply of milk; I permit the use of alcohol only in small quantities and avoid strong alcoholic liquors. Staying as much as possible out of doors with exercise without fatigue or overexertion is necessary; overstrain certainly produces a state of sleeplessness in these patients and easily calls forth an aggravation of the original suffering. The sunny side of the house should be chosen for the sitting and



living rooms, but these should never be on the ground floor. Those patients who cannot go out must as far as possible have a frequent change to previously well aired rooms. In the case of poor patients in whom damp sunless dwellings are the direct cause of their suffering so that arthritis like a sad privilege of the poor is called *arthritis pauperum*, it is very difficult indeed to carry out this most important requirement. Where the dwelling place is on a damp, low lying ground a change to a high, dry situation is altogether necessary.

While the strengthening influence of the general nourishment is to be always kept in view I have seen good results from the following medicinal treatment: easily digestible preparations of iron in conjunction with quinine and small doses of *nux vomica*. I attach great value to the administration of codliver-oil when it can be taken. The preparations of iodine, *tr. iodi*, and *sodii iodidi* and especially iodide of iron have a favourable influence on the pains—but I have been unable to note any influence on the swelling.

I limit the use of salicylate of soda to the acute or sub-acute exacerbations of the disease accompanied by fever or very great sensibility to pain. I have never seen great advantage result from the prolonged use of salicylate of soda in arthritis; the frequent unfavourable effects on the mucous membrane of the stomach demand that the administration of this remedy should be carefully watched. In severe cases of arthritis I have often observed affections of the hearing though whether due to the joints between the small hearing bones becoming affected I do not permit myself to judge; at the same time these symptoms may be aggravated by the well known influence of the salicylate on the hearing.

For the relief of the severe transient pains I prefer to order the newer nervines, antipyrin, antifebrin and phenacetin. For the rest, in arthritis as in chronic spinal affections, internal medication must be stopped as soon as the gastric functions appear to suffer.

I have seen little result from the local application of *tr. iodi* to the affected joints; I find that rubbing them with spirituous

and narcotic linaments and wrapping them in cotton wool is soothing and comforting.

In addition to internal medication there is also the thermal cure which is indispensable in the treatment of chronic joint affections. Although we do not see the same significant results from the employment of thermal baths in arthritis deformans or rheumatismus nodosus as in true chronic rheumatism at the same time favourable effects are produced on the tissue exchanges by stimulation of the circulation as well as by saturating the tissues. The warm baths relieve the pain in the diseased joints, diminish the tension of the muscles and permit the patients to attempt to practise movements which they cannot try out of the bath for fear of violent pain. Moreover in advanced cases I always found the patients relieved by our baths. I order the warm bath in such cases, but I do not find that a temperature higher than 29° R. is suitable because it sometimes prove too weakening and brings about an increased tendency to perspire. Besides the warm baths I have found the use of warm local douches with simultaneous kneading and movements of the affected joints very beneficial in the more torpid forms. Nevertheless this method should not be used too energetically. I can certainly confirm the report of the specially favourable influence of the thermal treatment in its various modes of application in the so called monarticular forms of arthritis, arising out of the causes already referred to; only in true *malum coxæ senile* did I observe that the relief was merely transient.

In combination with the above mentioned methods of treatment according to Remak's and Benedict's recommendation, the electric treatment of arthritis deformans and of the multiple rheumatism which is to be clinically regarded as dependent on it, is a most useful adjunct. I can confirm this from my own experience, yet I must forewarn that when the articular processes of certain joints are worn away, or when there is excessive erosion of the cartilages with partial luxations as well as great enlargement of the bones it is too late for the attainment of any striking results. These very advanced local changes demand surgical treatment which cannot

be avoided especially if there is a tendency to contraction. One can indeed bring about a diminution of the pain and by strengthening the remaining portions of the muscles enable a certain amount of movement to be performed. But if the electrical treatment is to attain with certainty the desired result it must be carried out perseveringly. One therefore cannot expect an improvement in so chronic an affection in the shortest time. Slow and imperceptible changes begin and gradually make themselves manifest until after some weeks the patient is often astonished how insignificant his pains have become, or how he can perform movements and support exertion which were impossible for him before.

In accordance with the idea of a central trophic neurosis the electrical treatment must in the first place be central and must be applied over the cervical enlargement of the spinal cord for the upper and over the lumbar enlargement for the lower limb, or according to Remak in a diplegic manner, that is to say, from the cervical enlargement sideways to the superior cervical ganglion of the sympathetic on the opposite side which is called the diagonal method by C. W. Müller. I have seen good results from both methods; but I give the preference to the sagittal treatment through the cervical enlargement in patients with impoverished blood on account of the milder effect on the vessels of the brain. From my numerous experiences during the many years I was assistant physician to Dr. Müller in Wiesbaden, who always specially recommended the central form of treatment—as well as from my observations during eleven years practice here—I most fully recognise the direct usefulness of this method. In the patients treated according to this system I noticed first a diminution of the diffuse pains as well as of those confined to the joint, there was also an increase of strength and of power of movement; at the same time I perceived a decrease in the so called claw position of the finger. The swelling in the joints also grew less and so much so, especially in the case of the metacarpo-phalangeal articulations, that the skin previously stretched beyond the normal could not follow the decrease of the swelling but formed cushionlike sacks. Similarly

the other vaso-motor and trophic disturbances which are so often observed in painful joint affections improved, the varying heat became an uniform warmth, the nails lost their brittleness and the disturbance of the functions of the skin disappeared. In the case of a lady who had already eight years been bed-ridden on account of severe arthritis, after several years absence of perspiration I observed her dry, exfoliating skin resume its normal functions in the most surprising manner.—Improvement in the joints follows still more quickly from the application of the galvanic current by its catalytic action; this effect is now-a-days shown in a manner in the rapid removal of serous exudations in the joints, striking I have seen this especially in the case of the knee joint. It is necessary to choose electrodes which accurately fit the joints and to consider the condition of the articulation as regards the strength of the current and the duration of its application; in conditions of irritative inflammation one may at the most use one third of the strength of the current allowable in the old torpid forms. The accurate estimation of the strength of the current is especially necessary in central treatment and in that of still inflamed joints and it is easily effected according to the method of C. W. Müller. For the relief of pain I have found simultaneous faradisation of the joint often very effectual. It would take us too long to give all the methods of treatment which are employed for this disease, I therefore take the liberty of referring the reader to the excellent article in Erb's "Handbuch".

The affection of the spinal column, *spondylitis deformans*, requires special consideration because through its involving the nerves passing out of the spinal canal it may cause neuralgia of the most varied form and other nervous disturbances. The annoyance which the painful and stiff vertebral column produces is still further increased by the neuralgic pains which start from it. I have seldom seen the most severe forms of spondilitis with marked curvature and coalescence of the vertebræ, yet in almost no case of arthritis have I failed to find the involvement of one or more vertebral bodies with corresponding results. A great deal of the



sciatica of old people is attributable to spondylarthritis of the lumbo-sacral vertebræ; it is well to note this as it gives the point of attack for the treatment in individual cases. I have found very satisfactory thermal treatment combined with the application of the electric current on carefully located diseased foci in the vertebral column. The monarticular form, with the exception of true *malum coxæ senile* already referred to, offers a specially favourable field for the combination of the thermal baths and electricity. In these forms I have frequently observed a very early inclination to connective tissue changes in the joint surfaces in which electric treatment according to the above mentioned principles brought about a power of passive and active movement. If the reflex atrophy of the muscles, especially of the extensors, produced by the disease in the joint, is alone improved by treatment of the joint, the simultaneous galvanisation of the affected muscles and nerves in combination with suitable massage leads more quickly to recovery.

As I have pointed out the necessity of passive and active movements in the monarticular form of arthritis I must also emphasise the support given to the above methods by such movements in the polyarticular form. This is especially so in severe cases of arthritis in which the disease itself is no longer capable of improvement, but where through skilful employment of the remains of the power of movement the use of the faculty can be preserved in some measure.

As a first principle in the treatment of arthritis, the prognosis of which until now has been always so unfavourable, I must again advocate early and persevering treatment of the disease according to the rules already given; I hold the conviction that if this is done the malady will not then attain the sad stage in which the disease can no longer be cured, but only relieved.

IV.  
DISEASES OF THE SKIN.

BY  
J. BEISSEL, M.D.





**T**HE outer surface of the body, the skin, is naturally the first point of attack for the baths in their different forms. In the first place the baths affect it functionally through their influence on its nerves, and secondly they act indirectly on the deeper structures and internal organs. The direct action on the skin is, however, always the most apparent and water has accordingly been used for the treatment of the healthy and diseased surface of the body from time immemorial. Its incomparable value for cosmetic, therapeutic and hygienic purposes is as undisputed to-day as it has been in past ages. It is the most indispensable means for removing dirt from the skin by softening its various connecting media; for softening the dried hypertrophied epidermis; for not only taking away the superposed products of disease, scales and crusts, but also for diminishing inflammation of the cutis and for bringing about the absorption of exudation lying therein.

Warm water possesses these qualities in a higher degree than cold, and by the addition of certain chemical substances the effect can be much increased. Soap has been employed as the best known solvent and softening agent from ancient times to the present day, and, as we learn from Lassar's writings, it was already used by the ancient Germans. For its proper use soft river or rain water is more suitable than well water which is often hard and contains much lime. Soap, however, cannot be used in all cases as the action of the different kinds of soap must vary with the

different methods of manufacture. The addition of pure alkali to the bath often fulfils the same purposes; for such a bath is often less irritating than when soap is employed and can be continued for a long time. Certain thermæ yield these alkalies in so great quantity and in such various forms that it is difficult, even with the chemistry of to-day, to combine artificially the active ingredients and thereby the healing power of these thermal waters, so perfectly as is accomplished by nature's lixiviation and precipitation during the circulation of the waters in the bowels of the earth. It is therefore evident that in the Aachen thermæ the softness of the water and its richness in chloride of sodium and carbonate of soda is the first thing to be considered; for these substances accomplish in the most excellent way the removal of the grease and pigments adhering to the skin, as well as the dried sweat and secretion of the sebaceous glands. These salts give to the water a special solvent power over crusts and scales, they loosen and detach the keratin and fat which connect the epidermic cells to one another and cause the latter to swell up. Moreover the superiority of such a thermal bath shews itself not only by removing the dead tissue but also by allaying inflammation. Where there is extensive loss of cuticle it forms an admirable substitute for it, providing a covering against the air as well as a protecting envelope for the deeper parts.

Some kinds of baths exercise a mechanical as well as a chemical influence on the skin; these are, especially, the spray- and the douche-baths. For hygienic purposes, as in public baths, the mechanical effect is chiefly looked for, the mechanical action is also indicated in skin diseases, especially the douche, whereby the duration of the disease and the irritability of the small arteries and veins is diminished and from which no evil effect, as of increased inflammation from its too strong or excessive action is to be feared.

In the thermal vapour bath the gaseous constituents of the waters are especially valuable as well as its remarkably higher temperature whereby the softening of the epithelial masses and exudations is attained in a greater degree. The most important



gases are carbonic acid and sulphuretted hydrogen. The first is always stimulating and produces a slight turgescence of the skin as well as some inclination to perspire. The sulphuretted hydrogen and the slight precipitate of sulphur which forms on the skins of persons taking the vapour bath is also of great importance. According to the theory put forward by Unna on the action of sulphur, the healing power of these baths is to be sought in the affinity of sulphuretted hydrogen for oxygen. By the arrest of growth in the young epidermic spinous cells the lymph paths of the epidermis are closed, the hyperæmia of the skin is lessened and with the contraction of the surface the formation of scales and fissures in the epidermis ceases and the growth of a normal horny layer takes place more easily. The correctness of this, at present merely theoretical view, is shown by cases of extensive eczema of long standing in which after the use of vapour baths and weak sulphur ointments a rapid process of skin formation takes place when the swelling and extent of the diseased portions begin to diminish.

The vapour bath has a greater antiparasitic action through its sulphuretted hydrogen and its high temperature than other baths, although it is more or less undeniable that all baths have a similar effect on the surfaces of our bodies which are indeed exposed to the attacks of innumerable micro-organisms; for those portions of the skin which in ordinary life are less frequently cleansed are freed in the bath from the accumulation of dirt and secretion the favorite soil in which saprophytes flourish. If indeed the most various organisms: *aspergillus*, *mucor*, *saccharomyces*, *bacillus subtilis* and many other cocci and bacilli grow upon almost every scale of the epidermis when it is placed in nutrient gelatine this is in still greater measure the case in those instances in which crusts are taken from pathological deposits in which secretions, exudations, urinary deposits, as well as substances employed therapeutically, such as fats and starch powder, offer a specially fruitful abode for these organisms.

It has been abundantly proved that a pure cultivation of these microbes when placed on a healthy skin produces a very

evident condition of irritation. The necessity for their removal from the diseased tissue makes itself therefore at once apparent. The bath is accordingly the indispensable means, for even if we can attain the same end partly and temporarily by antiseptic methods these are often, at least in the necessary state of concentration, too caustic and irritating to be used to a correspondingly great extent. In the careful removal of dirt, dead epithelium and crusts, in short, in the minutest cleanliness, we find the preliminary condition of a successful dermatological treatment.

In spite of this we cannot adopt the standpoint of Hebra and entirely renounce the use of internal remedies in the treatment of skin diseases. The mass of experience of the favourable effects following the drinking of the Aachen thermal waters in many instances rests on the simultaneous favourable effect of the waters on some general disease such as gout. But drinking the water is followed by increase in the secretion of the skin and of the blood which it contains, which apparently brings about a change in its character as a nourishing place for certain disease producing organisms, at any rate it is protected against recurrence. Whether we can bring the favourable results experience teaches as following the drinking of the Aachen waters into therapeutical connection with the not inconsiderable amount of sulphuretted hydrogen taken up internally by intestinal absorption must remain undecided. According to Unna's view the minimal addition of sulphuretted hydrogen to the endothelium of the blood vessels would have a drying effect, the vessels would be placed in a condition less suitable for the transudation of blood plasma and cells and consequently an important change in the state of the surface of the body would be brought about.

In the following paragraphs only those skin diseases will be discussed on which the Aachen thermal waters exercise a decidedly beneficial influence and which are not of specific origin. The latter will find their place in separate chapters. We therefore limit ourselves to the following diseases: Psoriasis, Chronic Eczema, Urticaria, Prurigo, Acne, Ichthyosis and Weakness of the skin.

## PSORIASIS.

The essential nature of this disease is to be considered under two separate heads: the general constitutional anomaly, and an injurious influence acting from without. The first establishes a condition of the skin which in certain patients makes it a peculiarly suitable nidus for certain kinds of fungi. One cannot state in what this disposition consists, it can only be said with certainty that it is hereditary. In almost every case of psoriasis skin diseases can be proved to have occurred in the parents or grandparents of the patient, perhaps not always psoriasis, but often chronic eczema, pruritis, &c., which were very difficult to cure.

If this tendency is once present in the skin it requires much less to make it diseased and a favourable nidus for organisms than under normal circumstances. It requires only the advent of the special fungus to call forth the disease. As far as is clinically possible the following example appears to strengthen this view: the father of twin brothers suffered until his death from chronic impetiginous eczema of the right forearm and elbow. Both the brothers, fine, powerfully developed men were free from any skin eruption until their fourteenth year. During a journey which they made together to the south of France both of them were attacked at the same time with psoriasis which spread itself in the form of round spots varying in size from that of a sixpence to that of a shilling, over the extensor surface of the arms and legs as well as over the breast and back. The disease was attended by sharp exacerbations and one brother whilst staying by the sea was attacked in his face and head. Part of his hair fell out, but grew again after the disappearance of the eruption. Both suffered more or less from attacks of the disease until their thirty-sixth year in spite of repeated courses of baths and the greatest cleanliness as understood by persons in a good position in life. At present both are free from the disease as the result of the application of

chrysophanic acid and the Aachen baths. Whether they will remain free from recurrence time alone can tell. It is only possible to imagine in this case that the action of some pernicious influence, such as a fungus, had found in these twins a suitable abode for its obstinate existence.

Another case may serve as an example of the influence of this tendency of the skin to the occurrence of psoriasis. A man who had been for many years afflicted with this disease contracted syphilis which was followed by an outbreak of the common roseolar rash. During this time the psoriasis disappeared, but when the roseola gradually subsided under proper treatment the old coin-shaped psoriasis again showed itself by gradual advances.

Many examples could be mentioned of the hereditary nature of this predisposition. The daughter of a teacher suffered very much from an obstinate psoriasis whilst her father was afflicted with chronic eczema of both legs until his death. In this girl the disease commenced in her fifth year and was always worse in winter.

The grandfather of two very pretty women had suffered from psoriasis, and these ladies, who were cousins, according to their own statement were first attacked by the disease when they slept in the same bed in the country.

Professor Kobner's view of the heredity of the disease is only strengthened by the recital of these facts, yet many still appear to hint at the existence of an external cause. If by this they mean a fungus, one is not at a loss to find them in the thickened layers of epithelium of the psoriasis eruption. Their great number and variety defies every attempt at enumeration. In particular certain hitherto unknown species of fungi were discovered by Lang, Eklund and myself in the epithelium layers lying nearest to the papillae. Whilst the nature of Lang's epidermidophyt has been called in question by the researches of Riess, those organisms cultivated by me from psoriasis scales and so well reproduced photographically by Unna in the Monatshefte für Dermatologie have been accepted by the last named author as an inhabitant of



the normal skin. Its steady growth from scales of psoriasis placed in nutrient gelatin caused me to suppose that the fungus was in some way concerned in the causation of the disease. The fact that inoculation of a pure culture on the healthy skin causes irritation and a slight formation of scales appears still more to confirm this view.

Be that as it may, it is sufficient that the therapeutics of psoriasis have for their object two special points. The first part of the task consists in changing the nature of the site on which the fungi flourish, the second, in the destruction of the existing fungi.

For the accomplishment of the first we possess an invaluable remedy in the internal administration of arsenic and its preparations. Its influence on the epithelic formation of the skin, nails, hair and epidermis combined with a frequently simultaneous tendency to the formation of fat in the subcutaneous connective tissue is corroborated by long experience in men and animals (horses). Arsenic also appears to have some influence on the functions of the skin, especially on the perspiration, and on that account it is used by the mountaineers of Styria on long marches. At any rate this remedy acts in a very special manner on the condition of the skin.

The second indication in the treatment of the psoriasis efflorescence is fulfilled by the employment of chrysophanic acid, chrysarobin and similar preparations, as well as in many cases by the use of tar preparations in a suitable form. In the first named remedy we possess almost a specific against the local eruption. It is used in the following manner. After having removed the scales, or the greater part of them, an ointment composed of chrysophanic acid and vaseline (1 in 20) is applied to the diseased spots and those only and if it is well borne the strength may be increased (to 1 in 10). Unpleasant symptoms of inflammation are avoided by beginning with the weaker ointment and never exceeding the higher strength given above. The recombination of chrysophanic acid and traumaticin is much to be commended, but its effect is not so powerful as that of the acid in vaseline. On the



other hand the destruction of the patient's linen on which the chrysophanic acid leaves indelible stains is avoided by the use of traumaticin; the danger is also less that the patient may bring small quantities of the acid into contact with the conjunctiva of the eye whereby very violent inflammation is caused. Before healing takes place and a normal skin is formed on the site of the psoriasis efflorescence a slight inflammation of the affected parts and their immediate surroundings always occurs. It appears therefore, that here as in many other parasitic skin diseases (Herpes, Favus), a change in the nourishing ground must take place in order to effect a cure. In many cases tar preparations do good service as adjuvants to the chrysophanic acid and often enable us to dispense with it. In the case of patients whose skin suffers from continued symptoms as the result of the use of chrysophanic acid I can recommend tar for quite recent eruptions occurring during the bath cure, which in Leuk are called Poussée, and which are often nothing else, or end in nothing else, than general psoriasis.

In the Aachen thermal baths we possess an excellent addition to the above principal means of treatment. The older authors (just as in Leuk at the present day), considered that by continued baths psoriasis has been cured. This is certainly true if the use of the waters is continued long enough to cause the occurrence of the dermatitis. We content ourselves with immersion and douche-baths of half-an-hour's duration and these by their contained chloride of sodium and carbonate of soda form an excellent means for removing the epithelial crusts and for averting or allaying the local inflammation which is caused by the use of chrysophanic acid. Moreover the internal use of the thermal waters is a remedy which is by no means over rated for producing greater activity of the skin and increased perspiration. In very many cases of psoriasis there is a certain dryness and harshness of the skin which often shows a pale yellow colour; in these and in many patients, as for instance in young ladies, the normal parts of the skin leave nothing to be desired in point of suppleness and colour,

and in whom the perspiration is normal, in the greater majority a special stimulation of the skin is required which is not difficult to attain by the use of the hot waters. But moreover, it also appears that the internal use of the thermal waters exercises an influence on the disposition of the skin to those diseases and their tendency to recurrence. The last requires the entire attention of the patient and the physician. Not only is the use of arsenic to be advised for a long time after the disappearance of the eruption, but also the smallest spot calls for immediate and suitable local treatment.

Obstinate cases of this disease have been permanently cured at the Aachen baths and as the result of all my experience I must give a preference to the methods employed here to any other and especially to those used in Leuk.

### ECZEMA.

The therapeutics of no other disease have been enriched in recent times by so many good remedies as that of acute and chronic eczema. Amongst these are the various medicated gelatines, plasters, chrysophanic acid and above all ichthyol. If we assign an important place to the Aachen thermal waters in the treatment of this disease we rely not only upon those cases of eczema in which on account of some constitutional anomaly (scrofula, gout) the malady assumes an obstinate form, but also on those which are characterised by the formation of crusts and scabs in which the cutis is thickened in consequence of frequent inflammation and where very little secretion is present. It is exactly in such cases that the value of our baths is shown by dissolving the crusts and removing the old infiltration of the cutis to the minutest particle, conditions which are urgently essential for carrying out the treatment of a troublesome affection which has lasted for many years.

But those conditions also are specially suited for treatment by baths and vapour-baths which are characterised by the

formation of crusts and scabs and which follow the acute stage of the disease, and in which the sero-purulent secretion continues and the cutis is irritated with formation of ulcers. It is for the most part natives of Aachen who take refuge from their sufferings in the baths, especially women who are also afflicted with varicose swellings of the veins of the lower limbs. In these patients, besides eczema, we have to deal with deep, torpid ulcers which are known as the *crux medicorum* and which must have already tried the patience of many of our colleagues. The cicatisation of the ulcerated eczematous spots is most decidedly accelerated by the baths and a normal surface arises without any further formation of scabs. The baths also act very favourably in healing the ulcers by exciting the flow of blood to the callous edges and by softening them. One must have had experience of many such cases in order to accurately judge the value of the baths in these torpid forms, which, after every other remedy had failed were completely cured by the supporting action of the baths and the patients were thus freed from their troublesome disease.

### PRURIGO.

This rare disease consists in an eruption of nodules which appears in earliest childhood and continues usually during life. These pale-red, epidermic nodules, of the size of a millet seed, occur in repeated crops and are localised on the extensor surfaces of the extremities. The intense itching provokes a corresponding amount of scratching and thereby a series of secondary symptoms, namely: excoriations, pustules and all sorts of eczematous manifestations. This distressing disease if it exists during youth persists with undiminished strength during the entire life time. It is curable only during childhood by good and persistent treatment. I remember one of my colleagues who was attacked in his twenty-fourth year. There were exacerbations from time to time, the skin became red, rough and covered with numerous small nodules, especially on the lower limb. The use of soap, naphthol

and menthol brought some relief from the tormenting itching. A long course of our baths freed the patient from the disease at last for a time so that he got better in the end and the improved condition lasted for some time. At any rate it was of the greatest benefit to this patient that for some time the secondary irritation was removed by the baths and the skin was kept soft and flexible. — Pruritis is a skin disease attended with equally troublesome itching, but without local symptoms and solely dependent on a nervous origin. This itching, however, spreads itself over the whole body and causes the patient from time to time to scratch violently with his nails, brushes, or other instruments, or it is limited to certain portions of the surface of the body. If there are other causes, as for example, the very frequent eczema of the anus or the genital organs, the trouble disappears by proper treatment of the fundamental cause. But often, and indeed very frequently, in old persons, in whom the skin is dry, faded and hard, *pruritis senilis* forms a troublesome attendant on old age. There is no doubt that long continued baths and especially our thermal baths and vapour baths are amongst the best known remedies for this troublesome affection.

#### A C N E.

Acne, *A. disseminata*, so often spread over the forehead, neck, breast, back, flexor surface of the thigh and arm, consists, as is well known, in various large red and painful nodules which have frequently a black comedo head on their apices. The disease has its origin chiefly in inflammation of the sebaceous glands and their surroundings which leads to suppuration and rupture, or to drying and calcification of the contents. In youth the forehead is the favourite site of this disease, also the edge of the hair on the neck and the places on which the beard grows. The essential cause of the disease is the closing of the hair follicles by a fungus, *Sycosis parasitaria*. It may, however, arise in hairy places from the use of medicaments, such as tar and grey ointment.



Obstruction and irritation of the orifices of the follicles are then the direct cause. The thermal water removes this hindrance, allays the inflammation and favours the ripening and rupture of the little abscesses in the pustules and facilitates their evacuation. The internal use of the thermal water has a favourable influence on those constitutional anomalies to which this troublesome affection is generally ascribed. Amongst these are especially: chronic dyspepsia, and in women, irregularities of the sexual functions. The acne eruptions which occur in some people after the use of certain medicines such as iodide or bromide or of potash and which very often cause them uneasiness must also be mentioned here. The bath- and drink-cure has a very accelerating effect on those symptoms.—That description of copper nose which is known under the name of *Acne rosacea* and which owes its origin to the dilatation of the capillaries which occurs simultaneously with an increased secretion from the sebaceous glands is relieved by the internal and external use of the thermal waters. As the disease is often the outward expression of an internal constitutional or organic weakness; for example: in men the abuse of spirits and chronic gastric and abdominal catarrh, in women frequently uterine affections, the drinking cure in association with a regular diet acts favourably by improving these abnormal conditions. In the more advanced stages of the disease the use of the thermal waters can only alleviate the inflammation and seborrhoea. If a hypertrophied condition of the cutis is present one must have recourse to more energetic remedies, especially the ointment given by Lassar or to puncture or other operative measures.

### URTICARIA.

These annoying eruptions occur in suitably disposed persons after errors of diet, or in women at the menstrual periods, they are diminished and the intense itching allayed by the use of luke-warm baths during the occurrence of the attack. Frequent recurrence cannot be avoided unless one is able to recognise and



remove the exciting cause. For this no general rule can be given, but the peculiarities of each individual case require special consideration. Urticaria, occurring in youth, often disappears of itself at a riper age, yet many persons continue to be afflicted with it to the close of life. Malaria appears to predispose to the occurrence of urticaria, and in two carefully watched cases in which malaria had been acquired in the Roman Campagna the intermittent fever disappeared during the outbreak of a very violent urticaria while the patients were staying here. Drinking the thermal waters and bathing in them sometimes appeared to diminish the tendency to recurrence and in the attainment of this result the change in the mode of life and the effect of the baths on the irritability of the nervous system played their own part.

In the urticaria which occurs occasionally after the use of medicines such as antipyrin, salicylate of soda forms a very valuable and commendable remedy. Quinine and arsenic cannot be dispensed with in suitable cases, but in spite of their use one often finds that, contrary to all expectations, the disease is obstinate and inclined to constant recurrence.

Cases of colossal thickening of the skin of the legs and face occasionally come to Aachen for treatment. In so far as allaying the inflammation of the cutis, removal of the thick crusts and healing of ulcers lying in the fissures and folds are concerned the bath-cure is not entirely without effect.

The Aachen bath has as little direct influence on *Lepra* as on the other parasitic skin diseases for which it was occasionally used in former times, for example: scabies, favus, and pithyriasis versicolor. The waters at most form a suitable support to the proper specific treatment.

Before we close these remarks we have still to mention the value of the bath- and drink-cure in those conditions of malnutrition of the skin which are known under the name of skin-weakness. This condition appears as the accompaniment of many diseases, for example diabetes, anaemia and diseases of the central nervous system, in which the skin may often be of extreme

dryness and poverty. I remember, indeed, one case of tabes and one of diabetes in which during the removal of the flannel shirt which the patient wore next his skin a rustling of the skin as when one strokes the fur of a cat or a fox was observed which made the patient very uneasy. In the period of convalescence from many of the acute exanthemata the skin shows a very torpid condition. It is evident that through the diminished activity of the skin many diseases become complicated in a definite manner. Even the lowering of the power of absorption of the skin under certain circumstances in the unskilful treatment of many diseases e. g. syphilis, result in definite changes. It is in these conditions that the Aachen thermal baths exercise a most distinct influence in consequence of their richness in chloride of sodium and carbonate of soda which can scarcely be exerted by other baths, or indeed by any other means.



V.

INJURIES AND THEIR CONSEQUENCES.

BY

CARL SCHUMACHER, M.D.







**A**MONGST the patients, who visit the Aachen springs on account of difficulty in movement and the use of their limbs, a by no means small number ascribes the origin and the consequences of their malady not to an internal disease, but to some external injury. These injuries have affected parts previously healthy and have left most distinct traces on those points, which are most exposed to them.

Some have had a contusion from a fall or a slip, the force of which has been transmitted through the skin and muscular layers to the joint; in a second class a dislocation, which ruptures the tissues of the capsule of a joint, the attachment of ligaments, or the articular cartilages, produces a severe joint affection; in others the joint is indirectly affected through fracture of a neighbouring bone by the extension into it of fissures and splinters.

The consequence of the changes in the joints arising out of external injuries have many features in common, which are manifested in different degrees in our patients. There may be inflammation arising from the injury, which in spite of proper rest and suitable bandages has not entirely disappeared. Thickening of the capsule and ligaments consequently takes place, exudation and ankylosis form between the ends of bones, fibrous bands or cicatrices form around the fine nerve bundles and lymph and blood vessels. The external skin becomes doughy and swollen to an extent corres-

ponding to the condition of the joint, the joint itself gets thickened and distended, perhaps fixed in a faulty position, while pain on movement and atrophy of the muscles connected with the joint limit its use still more.

Fractures of the bones compel many patients to seek a cure here. The line of fracture into the joint as just mentioned, or that of separation in the shaft of a bone, continues to be a seat of pain after union has taken place and has been not incorrectly regarded as an unwelcome barometer. Œdema occurs in these parts and especially in the lower limbs and is characterised by tough swelling and discomfort.

The thermal treatment by means of our hot springs affords a wide field for the improvement and cure of these affections. It frequently accords well with the treatment for the removal of products of constitutional disease, which develop in the joints especially after acute rheumatism, or in consequence of gout or chronic rheumatism (cf. these articles pp. 63. 97), but which partly bear another stamp. For these injuries generally affect persons in the full strength of life, who, accustomed to work and activity, have at the time of the local injury a sound constitution and possess a more healthy nervous system and a firmer will, than patients weakened by frequent feverish relapses of those diseases just mentioned.

The thermal treatment may therefore be energetically carried out by means of very warm baths, vapour baths and especially hot douches. Signal results will be attained by raising the temperature of the last to 32 or 35° R., and by regular massage either combined with the douche or following it, in order to soften and bring about the absorption of the solid exudation, to break down the ankyloses and thus to make immovable or stiff joints useful. The physician himself will perform passive movements in order to stretch and rupture in the gentlest possible manner the apparently immovable connections threatened with ossification by means of manipulations, which often can be carried out only under anæsthesia.

The warm baths relieve the pains and fresh swellings inseparable

arable from this proceeding, whilst the electrical treatment combats the articular neurosis and opposes the atrophy of the muscles as far as this is not benefited by the douches and massage.

The number of patients present here shows clearly how many are obliged to have recourse to the healing powers of our thermæ in spite of treatment at home.

If such is the case in a great measure during the "piping times of peace", experience proves a remarkable increase in the demands on the resources of our thermæ as soon as social revolutions and wars provide a rich harvest of injuries. In the time of our most celebrated Aachen colleague, the physician Franciscus Blondel, who about the year 1688 in his famous work gives the names of those officers, who having been wounded at the siege of Arras in the shoulder, arm and leg were cured at these springs, after the battles fought by Prince Eugène and Marlborough in the Netherlands against the French, after the campaigns of Frederick II, the great king, after the murderous battles, by which our western Germany was over-run, finally after 1866 and 1870 the thermæ accomplished after times of great bodily and mental trial, what medicine and the skilful hand of the surgeon had been obliged to leave unfinished. They have restored the invalid, worn out with fatigue and misery, with loss of blood and want of care, and have made the diseased organism capable of throwing off injured skin and fragments of bone, of bringing deeply lying centres of suppuration to an outlet, of closing fistulæ by sound tissue and of making stiff, lame limbs capable of further service.

In a just appreciation of these advantages Aachen has been several times organised as a military bath<sup>1</sup>, so in 1758 after the battle of Crefeld and in the years IV and VIII of the French Republic.

If even our enemies on the field of honour desired to have their wounded treated here, it is desirable, that in future, following

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<sup>1</sup> Dr. B. M. Lersch, Geschichte des Bades Aachen, 1870.

the example of France, Italy and Austria, our government should adopt the special plans, which were prepared in 1866<sup>1</sup> but unfortunately not carried out and create here for the Empire a great new military bath with the most complete arrangements.

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<sup>1</sup> A proposal concerning the erection of a large bathing establishment at Burtscheid for Prussia's invalided soldiers made by the Medical Society at Aachen 1866.





VI.

CHRONIC CATARRH OF THE DIGESTIVE TRACT.

BY

CARL SCHUMACHER, M.D.





**T**HE drink-cure at the Elisenbrunnen stands in high repute with the townspeople of Aachen for many gastric and intestinal troubles of an acute and chronic nature. The good effect of the springs on the better observed foreign colony has the confirmation of long experience in certain disturbances of the upper and lower portions of the digestive tract. It is but seldom, that the springs are unproductive of good; the greater number of the patients drink the waters easily, as soon as they become accustomed to the smell of sulphur, many drink it with great benefit in daily doses of 400 to 600 grammes in the morning and 200 to 400 in the evening.

The water excites a marked and lasting improvement in the appetite, which is of great importance for all who have delicate health, as well as for carrying out more energetic treatment.

Amongst the manifestations of impaired gastric power: water-brash, weakened and delayed digestion, morning vomiting, of tough and greenish-white masses of mucous are soon relieved and these difficulties usually disappear in the course of three or four weeks. This occurs specially in the case of patients from those countries where very indigestible food and strong spirituous drinks are used both on account of conditions of climate and social usages and which afford favorable conditions for the occurrence of gastric catarrh.

The Aachen drink-cure may also be ordered as an efficient substitute for Karlsbad in the case of people whose health is

impaired through debility or who actually suffer from the symptoms just mentioned.

The drink-cure is also very effective in cases of catarrh of the bileducts and the resulting enlargement of the liver and jaundice.

If the patient has made sufficient progress under previous treatment to be able to use the waters these relieve the swelling of the congested mucous membrane which consequently permits the natural excretion of bile to take place as is shown by clearing of the urine, appearance of bile in the stools and whitening of the skin.

The prognosis is also favourable in the jaundice, which follows the passage of a gall-stone, and which I have seen to last as long as fourteen weeks in a case, in which there was no impaction.

Older practitioners have observed occasionally accelerated passage of gall-stones.

The thermal waters combined with carbolic lotion have proved an agreeable and effectual remedy for the obstinate itching of the skin, if the icterus which occasions it, is dependent on a removable cause.

The drink-cure is of little value in severe forms of gastric catarrh, in which there is excessive formation of gas-swelling and dilatation of the stomach.

The intestinal canal as a rule supports the thermal waters as well as the stomach. With the greater number of patients it is a mild aperient; in some constipation occurs, which is removed by increasing the dose or by a slight addition of Karlsbad salts. Those who require mercury should avoid the Karlsbad salts and take castor oil in capsules instead.

The use of the waters is attended with good results also in chronic, so-called habitual constipation and many patients praise them for the regular return of the long absent daily evacuations as the most grateful result of the drink-cure. This is all the more so, as the painful sensations in the abdomen, the feeling of distension and cold disappear at the same time. In the last century the waters of these springs were drunk in so large a

quantity, that an extraordinary stimulation of the intestinal functions was the result. With careful regulation of the diet, obese persons can in a similar manner bring about a reduction of their corpulence.

In chronic diarrhoea there is scarcely any result worth mentioning to be attained; on the contrary the use of the springs must be discontinued, if a favourable change does not occur after beginning with small doses and gradually increasing them. I should advise the same precaution in chronic dysentery.

In former times the Aachen waters were used as a means of detecting the presence of tape worms and at the present day many patients are surprised during the course of the drink-cure by the unexpected passage of parts of these intestinal parasites.

Rectal piles are often and usually accidentally noticed in our patients and a few come to Aachen on account of these tumours. The external dilatations of the veins are without importance and undergo but little change during the treatment here, it may however happen, that by coagulation of the venous contents an inflammatory irritation arises, which usually disappears after the little tumour is slit up and the clot removed.

On the other hand internal piles situated above the sphincter usually cause great annoyance and give trouble especially during the violent efforts at defecation and by the painful feeling of pressure in the sacral region, the slimy evacuations and the hæmorrhages, which are venous and only occasionally of arterial origin.

For the treatment of these severe cases surgical aid is necessary. It may however be mentioned, that by inducing regularity in the functions of the bowel by the drink-cure and by frequent injections and lavements of the walls of the rectum with the thermal water, the slimy secretion is often sufficiently diminished and the hæmorrhages may disappear. Complete abstinence from alcohol should be ordered and is an essential condition of such results.

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VII.

CHRONIC CATARRH OF THE PHARYNX,  
LARYNX AND BRONCHII.

BY

CARL SCHUMACHER, M.D.





**T**HE air passages, with their outlet the throat communicating with the nose and mouth, form a connected series of openings and tubes, which become constantly narrower towards their terminations, though this does not take place in a gradual manner. Delicate instruments can be introduced into the larynx and the mucous membrane which lines the greater and lesser bronchii, may be reached by suitable remedies.

If an individual previously healthy contracts that form of inflammation of this portion of the mucous membrane, which we call catarrh, we are usually in a position to cure him completely. But should the injurious influences be repeated and should they find favourable conditions in the patient to permit of their gaining a firmer footing, in that case instead of an acute affection of the mucous membrane, a tiresome disease develops, which we denominate chronic catarrh and which is less grave on account of the danger, by which it is attended, than through its duration.

We will briefly examine the most frequent causes of chronic catarrh of the organs already mentioned.

In many persons the nature of their profession or exposure to irritating influences is injurious, whilst too long continued efforts and repeated congestions do not permit the throat and vocal cords any period of restoration, or end by altering their delicate anatomical structure. To this class of patients belong clergymen, barristers, actors, officers, and on the other hand heavy smokers

and beer-drinkers. In another class the trouble is induced by immoderate living. Most people eat and drink too much without corresponding exercise and muscular effort to consume the excess of supply. In this manner an excess of the fluids of the body is produced, which even in youth leads to an extraordinary deposit of fat, to biliousness, shortness of breath, as well as to increased secretion of perspiration. If such a fullbodied person is exposed to any violent disturbing influence, the irritated respiratory organs or the throat respond by a significant slowly coagulating secretion from the mucous membrane, which is saturated with fluid lymph.

A constitution too feebly developed acts as well as a predisposing cause of chronic catarrh, especially of the throat. It brings about a condition of mal-nutrition of the mucous membrane and, by the anæmia, which is also present, diminishes its powers of resistance. Hence its extreme vulnerability as regards irritants and its tardy restoration on account of the atrophy of its glands and muscular structures. Hence also the tough and scanty secretion, which constantly becoming dry, causes greater discomfort than an abundant secretion, which remains fluid and can be removed without much trouble by hawking and coughing.

In the two classes of constitution already mentioned scrofula with its excessive proliferation of granulation tissue, its slow powers of assimilation and its tardy reparation of injuries, forms a fruitful soil for chronic catarrh, which occurs more frequently in the throat, windpipe and bronchii than elsewhere.

Weakness of the skin is another cause of catarrh. A healthy skin through its richness in blood, besides being the chief field of regulation of the temperature of the body, offers a powerful protection against the invisible morbid agents, which threaten the body from without. On the other hand the weakly developed skin is too defective in power of rapid nerve conduction, as well as in the ready variations in the quantity of blood to afford the necessary resistance and so gives time to the noxious agent to establish itself and produce catarrh of the above mentioned mucous membranes as the expression of its activity.



Experience shows, that certain diseases of the skin, especially chronic eczema, allowing for the difference of site, are frequently associated with essentially similar chronic catarrhs of the smaller air passages, which in their acute exacerbations are known to the practitioner as asthmatic attacks.

I omit from this paper the large class of chronic catarrhs of the throat and airpassages, which arise in a mechanical manner as the result of diseases of the heart and lungs, as well as those, which are dependent on disturbances of the circulation, because these are merely of secondary nature and are relieved only when the severe fundamental disease, on which they depend, is temporarily, or, as rarely happens, permanently improved by the administration of suitable remedies.

Certain points must particularly be held in view in the treatment of these conditions. First, to support the efforts of nature by the administration of moist warm air. We know, that the external air, which is too cold for the larynx and respiratory organs, is led through the many windings of the nasal passages and the upper and lower pharynx, to deposit its impure constituents and to be raised to the temperature of the body. The second indication is to strengthen the organs of the skin, so that it resumes its functions as a regulator of temperature and renders sudden accessions of cold harmless to the sensitive mucous membranes. Finally, to heal as far as possible, any eczema present on the skin, so that this tissue is brought into the healthiest possible condition.

These three general rules for the treatment of chronic catarrh of the pharynx and air passages are best supplemented by the use of the mineral thermal waters, especially the Aachen sulphur waters, because, as already mentioned in this work, they possess in a remarkable degree the principle, which is wanting in every other purely local and medicinal treatment, namely, the simultaneous influence on individual diseased organs, as well as on the skin and the entire organism. Scientific experience has placed its authoritative stamp on these therapeutical suggestions. From ancient times to the present day the so-called chronic catarrhs have been treated

with signal success by drinking the warm sulphur water, by inhaling the vapour and the gases of the springs combined with it. Since suitable atomisers have been provided and the inhalation-room of the Kaiserbad has been established in 1865, by inhalation of the atomised thermal waters and by the usually simultaneous, manifold methods of application of the different forms of baths these affections have been treated and cured. We may add to this, that the torpid forms of scrofula, and, amongst the skin diseases, eczema of long standing are suitable subjects for the thermal treatment.

Besides the warm baths there are the douches, which energetically stimulate the tissue changes and which through their penetrating stimulation of the skin and muscles produce such a strengthening and hardening of the former, that with sufficient care it becomes able to withstand the changes of weather and to support the injurious influences of a foggy, damp and cold climate.

As the mucous membrane of the throat and larynx becomes swollen, congested and deprived of its protecting layer of secretion by the inhalation of the warm sulphurous vapour, it is highly desirable, as a measure of precaution, that the inhalations and baths should take place in the same warm rooms. Indeed, in many instances the use at home of the simple Siegel's spray-apparatus is considered equally useful and on account of the risk of catching cold being thereby avoided is preferred to the inhalations in the Kaiserbad. But the difference is so striking between this weak little apparatus and the effect of half an hour's comfortable rest before our atomising machines, delivering mighty streams of vapour in the inhalation hall, that the greater suitability of the latter, which can be used either through the nose or the mouth, cannot be doubted. Moreover since we have taken the precaution of prescribing inhalations before the baths and douches are taken and ordered the latter after the inhalation of vapour, by this means the chance of taking cold is removed and we have every reason to be satisfied with the results attained.

Two other points remain to be noticed. In the first place

during the thermal treatment of these chronic catarrhs every other local therapeutical measure, especially astringents, should be laid aside and care must be taken that no unforeseen injury is done to important organs of special sense, as for instance that of smell, by indiscrete or too long continued inhalations.

I have collected a great number of cases, especially from Belgium, Holland and the north of France, which had had a course of treatment for chronic catarrh. I am aware, that permanent cures took place in many of these; many others have become constant visitors to the springs after their first trial of them, whilst the improvement made rendered them able to follow their callings even in the bad seasons of the year, so that they returned to continue a course of treatment, which had proved at any rate very beneficial to them after the accumulated troubles of one or two years. There were many barristers amongst these patients. According to the method prevailing in France they found a three weeks drinking- and bath-cure at the sulphur springs with special use of inhalations to relieve the overstrained and fatigued vocal organs. There were also many patients, who were affected with asthma as the result of chronic bronchial catarrh, who were cured or greatly benefitted here.

The treatment is well supported by the favourable climate of Aachen, which on account of the proximity of the sea and the prevalence of the westerly winds coming from it is mild and soft, so that the throat and respiratory organs do not tend to become dry.

Follicular and granular pharyngitis deserve a few words of notice. It is not every one, who has the back of the pharynx studded with red, fleshy nodules, formed by the swollen follicles and the side walls covered with thick deposits, that suffers notable inconvenience from the changes in his mucous membrane; far more frequently a large number of persons, whose throats are in this condition, have no idea of the discomfort, which these proliferations give to others. It is therefore only proper in these indolent cases to abstain from all active treatment and only to remove the patient from injurious influences.



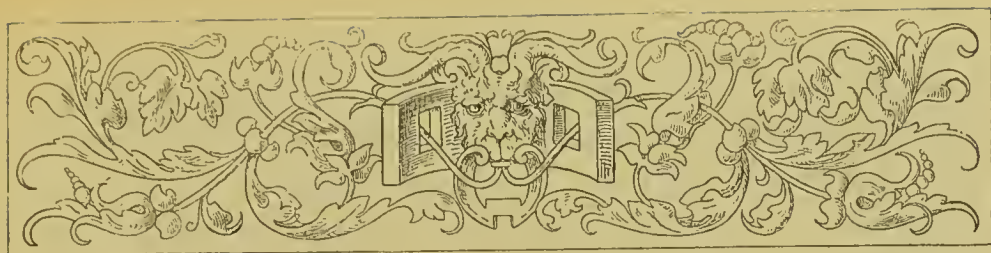
VIII.  
SYPHILIS.

BY

B. BRANDIS, M.D., AND C. SCHUMACHER, M.D.







**T**HE importance of the Aachen thermæ in the treatment of syphilis is well known as an ancient historical fact.

In 1564 the writings of the Aachen physician F. Fabricius had appeared being the first literary reference to the efficacy of the sulphur waters of this place in the treatment of syphilis. Fabricius recommended the springs for those persons who were affected with the disease or who had suffered injury from the then already hurtful inunctions of mercury. The treatment of this affection lay very much in the hands of the laity whilst physicians were averse from the use of the disreputable mercurial treatment. Under these circumstances and with the want of scientific investigation it is explicable that syphilis and the effects of mercurial treatment were confounded with one another. In this manner arose the dominant belief of the greater number of the physicians of the sixteenth and following century that syphilis depended on the effects of the quicksilver and that the sulphur baths, which had proved useful in cases of misuse of mercury, also exercise a healing influence on syphilis itself. A true knowledge of the disease was acquired only about the middle of the present century. Whilst those who were opposed to the use of mercury thought they found a welcome proof in the results of the Aachen thermæ of the curability of syphilitic symptoms without the use of any metallic remedy, patients were sent here by authorities opposed to mercurial treatment who from similar

facts acquired the valuable experience that syphilitic manifestations can be arrested or cured only by the use of the specific remedy.

Aachen has therefore assisted in a special manner in deciding in favour of the specific treatment the battle which has raged for centuries in the therapeutics of syphilis. Whoever denies the influence which the cure of thousands of persons at the Aachen *thermae* has had on the medical thought of all parts of the world must hide himself behind the protection of his own ignorance.

The observations made in Aachen have contributed in other respects to the great revolution in the treatment of syphilis in so far as they have caused overwhelming preference to be given to Siegmund's inunction cure over all other forms of mercurial administration. No place could be more suited to raise the inunction cure to the position which it now occupies as a successful method of treatment at the present day. Since the memory of man patients have come here who furnish an extraordinary variety of material for observation, whilst the proximity of the springs made it easy to combine their properties with the use of the mercurial inunctions. It is obvious that the softening of the skin consequent on the warm baths must facilitate the entrance of the mercury which is taken up by the dilated capillaries and conducted through the system.

We also cherish the conviction that a stay in the bathrooms warmed by the natural heat of the springs, where the air and the walls always preserve the same even temperature is calculated to protect the patient against the justly dreaded risk of catching cold, whilst drinking the sulphur water simultaneously with the bathing offer such powerful, yet gentle, means of increasing the tissue changes that the patient is protected as far as possible against overloading with mercury.

From these simple principles, so easily understood by all patients, has arisen the confidence with which sufferers from the effects of syphilis come here from almost all parts of the earth.

It is certainly in favour of the efficacy of the Aachen cure that it has been imitated in so many other places, but in tech-

nical perfection Aachen will continue to stand pre-eminent as long as men will require inunctions. The excellent properties of these thermæ in their manifold applications, as baths, vapour baths and douches, the long practised methods of inunction and finally the well known perseverance of the patients—all these conditions render possible a course of treatment which on account of the nature of the disease has to be persevered in for many months, sometimes for years, and without which the entire destruction of the morbid agent could not be attained.

We will here consider the thermal trial, or “safety cure”, for which many patients are sent to the sulphur baths. We do not think we can describe it better than in the words of our experienced colleague late Dr. A. Reumont<sup>1</sup>.

“The trial or safety cure has been over- as well as under estimated. It is employed in the case of persons who have for some time undergone anti-syphilitic treatment and in whom no active symptoms are apparent, or who still bear suspicious signs of the disease, such as glandular enlargement, rheumatic pains, eruptions on the skin of an uncertain character, falling of the hair, &c. Experience shows that it is difficult, indeed impossible, to declare any individual free from syphilis with positive certainty merely because he has undergone any form of anti-syphilitic treatment. Only the lapse of a more or less prolonged interval in which no further symptoms appear can decide this. It sometimes indeed happens that the thermal cure, especially the more stimulating forms such as the hot baths, douches and vapour baths, brings out syphilitic symptoms on the skin or mucous membranes, or enables us to decide that other symptoms are non-syphilitic. The stimulating methods pursued at the baths bring out in a short time those signs which would ordinarily have taken a much longer time to appear. For this reason such a “cure” may be called a “trial-cure”. Yet we must say at the same time, that our baths are worth no more than others as a

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<sup>1</sup> A. Reumont, *Die Thermen von Aachen und Burtscheid*, 1885. Separat-Abdruck, *Behandlung der Syphilis*, p. 4.



“touchstone” and that they do not always act in the way above mentioned, but only in very rare instances. The term touchstone in the French sense is a misleading exaggeration as is also the definite denial by many physicians of this action of the waters in bringing out the dormant signs of syphilis which, though rarely, undoubtedly occurs. Moreover in the “trial-cures” one must trust only to positive results and consider a negative issue, (that is to say, if no distinct syphilitic symptoms are produced during this treatment) by no means as a proof that the patient is completely free from the disease”.

Returning to the special subject of this chapter, the inunctions are made for the most part with grey ointment (Ungt. hydrarg. ciner. Pharm. Bor.). In recent years, like others of our colleagues, we have sometimes used mercurial soap (Sapo mercur.) instead. This soap commends itself on account of its being easily rubbed up with lukewarm water, especially in the case of delicate women, and also on account of its greater purity. Yet in some instances the cooling of the body after frequent wetting with water, which can not always be avoided, was not found to be agreeable, and the patients preferred the warmer ointment at least in winter.

It can easily be understood that, occupied as we are uninterruptedly with inunction cures, the manner in which the mercury contained in the ointment enters the body is a question of the highest interest for us. The way in which it is absorbed has been carefully studied during the past fifty years and two works published during the last ten years deserve special mention. The first is by P. Fürbringer<sup>1</sup> and the second by our highly respected Aachen Chemist, Dr. Wings<sup>2</sup>. We will discuss both these books somewhat in detail.

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<sup>1</sup> Experimentelle Untersuchungen über die Resorption und Wirkung des regulinischen Quecksilbers der grauen Salbe. Archiv für path. Anat. und Phys. u. f. klin. Med. 1880—82. Bd. 3. pag. 491—515.

<sup>2</sup> Ueber Abdunstung des Quecksilbers aus dem bei der Inunctionskur in Anwendung kommenden Ungt. hydrargyr. cin. Vierteljahresschrift für Dermat. u. Syph., 1881, pag. 589—601.



Fürbringer states that the globules of quicksilver in the ointment do not pass through the uninjured epidermis and cutis, therefore they do not pass through the entire thickness of the skin, but merely become lodged in the blind extremities of the pouches that are formed by the hair follicles and sebaceous glands. In these places, as already described by earlier investigators, the metal enters into close combination with the secretions of the skin, the serum and the sweat, and through their influence becomes changed into a soluble form which is capable of being taken up by the fluids of the body. This method of absorption through the sound skin acts with much greater energy if the mercury enters at once into the living, circulating blood through a wounded surface, for according to Fürbringer the blood may evolve from the entering mercury an active oxydation product.

Wings offers a different solution of the question. Supporting himself on the well known fact, that mercury evaporates quickly, he ascertained by exact experiment, how much of the metal disappears from a given strength of grey ointment in twenty-four hours and in this manner discovered the factor of evaporation of the mercury. In his later experiments he saw that the evaporation of the mercury went on uninterruptedly under water and that at the temperature of the body an ascertained quantity of quicksilver vapour passed into the surrounding damp media without becoming condensed.

These statements are very important, for if we take the skin at blood heat as the damp medium and rub into it a known quantity of grey ointment we may be certain that a definite quantity of mercury from the surrounding layer of ointment and the deposits in the follicles of the skin becomes volatilised and permeates the moist surface in the form of vapour. In this state of fine division the metal will easily undergo the necessary chemical changes in order to be taken up by the body. Moreover we know that the moist uninjured skin is penetrable by surrounding gases and the passage of mercurial vapour through it has been proved by previous experiments. There is also ground for the opinion that the

mercurial vapour developed during the inunction penetrates the skin and during its passage undergoes the chemical change already referred to in order that it may enter into the animal economy as a healing factor.

Wings does not venture to state the exact quantity of mercury taken up by the skin, but if the probable amount must be given, the following figures taken from his work closely approach our own idea of the quantity. With an inunction surface of 750 sq. cm., which is equivalent to that of a medium sized thigh, 0.0106 gramme of mercury may be considered as the quantity volatilised in the skin and penetrating through that tissue into the organism in twenty-four hours. The quantity 0.0106 of mercury corresponding to 0.0143 of perchloride is therefore equivalent to the usual dose of perchloride of mercury used in intra-muscular injections.

If we take the results of Fürbringer and Wings together, the answer to the question as to the absorption of the mercury contained in the grey ointment consists in this: that to the chemical change in the metal deposited in the skin there is superadded a direct transit of the mercurial vapour.

So much for our two authorities. At the same time we may not yet dismiss this portion of our subject, for the grey ointment does not only penetrate the skin but also evaporates into the air surrounding the site of inunction, this latter quantity, according to Wings<sup>1</sup>, is twenty times greater than the first and for an inunction surface of 750 sq. cm. amounts to 0.252 gramme in twenty-four hours. The importance of this fact will be placed in a clearer light by the authoritative researches published in the Imperial Health Reports. The Report states "... that besides the direct influence on the skin a much larger quantity must be taken into account as exerting an important influence through being inhaled as in the case of the skin smeared with grey ointment the mercury evaporates at a temperature of more than

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<sup>1</sup> Loc. cit.

30° C. and that one cbm. of air at 30° C. may, according to the experiments, take up as much as 16.82 mg. of mercury." Of this large quantity a greater or less amount may reach the respiratory tract unhindered, unless with the conviction of its injurious influence we carry out certain strict precautionary measures so that, as in Aachen, the possibility of its occurrence is excluded as much as possible from the inunction methods pursued there. We shall refer to this point again later.

The second important question is, How much mercury enters the body by the method of inunction?

It is stated, chiefly by the opponents of the method of inunction that, unlike the injection of mercurial solutions, it does not allow of any careful estimation being made of the quantity of the remedy, which enters the body and also that if the inunctions are carried out with sufficient energy the organism may become saturated with the metal. To the first objection we reply that we possess sufficient information on many important points by the employment of the inunction cure. We know the exact weight of ointment used and that 3.0 grammes for this one, 4.0 for that and 5.0 for the greater number of patients are a necessary and sufficient quantity; we can estimate the force which a practised rubber applies during twenty minutes friction; we can judge the size of the limb on which the inunction is applied; we know the circumstances under which our patients live; we study their condition, the changes in their ailment, its duration; the excess, the insufficiency of treatment and we have the regulation of this last in our own hands. The inunction cure gives us at least as detailed information of its results as the injections and every other method of mercurial treatment and those results form our sole guiding rule as long as the ultimate fate of the mercury which is conveyed to the interior of the body by any means whatsoever remains unknown to us.

The other reproach to our method, that the body becomes overladen with mercury is just as unfounded. Moreover all the evidence on this point urges us to the conviction that the medic-

ament will be incorporated in the body of the patient only in doses which do not exceed those usually employed in other methods of mercurial administration and will be restrained within limits compatible with health. Thus Fürbringer states <sup>1</sup> that the living blood is able to dissolve only a very small quantity of mercury; Wings shows <sup>2</sup>, that only small quantities of the metal contained in the grey ointment are volatilised in the skin and the researches of Vajda and Paschkis <sup>3</sup> prove, that the excretion of mercury after inunction occurs later than after subcutaneous injection of easily soluble preparations of mercury and they affirm that it is not proven that mercury passes into the circulation with each fresh inunction.

If therefore, as the result of experience, we recognise a properly conducted inunction cure as the most important method of treating syphilis and value it beyond all other methods when we have to deal with the most severe and obstinate specific symptoms we find the ground for our preference in the manner in which it attains its object in those cases.

In this process we find that tiny particles of mercury are brought into relation with the circulation from all the innumerable depositories of the grey ointment in the skin. This is accomplished imperceptibly without accompanying pain or rapid excretion, as when injections of soluble preparations of mercury are employed, without the great danger which attends the use of the more insoluble preparations and generally without those disturbances of digestion which accompany the internal administration of mercury. It also gives the body time to become accustomed to the remedy which is, both for the weak and the robust, our mildest specific means of treatment. The absorption is at the same time constant because the conversion of the metal by the fluids of the body terminates only when every one of the myriad particles contained

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<sup>1</sup> Loc. cit.

<sup>2</sup> Loc. cit.

<sup>3</sup> Ueber den Einfluss des Quecksilbers auf den Syphilisprocess, 1880 p. 296 und 297 Anmerkung.



in the skin has been consumed. The inunction cure also renders long continued mercurial treatment possible and adapts itself to the tedious character of the disease.

The slow absorption of the grey ointment does not prevent us from using it upon occasion as a most energetic remedy. As soon as we increase the quantity of the ointment on a sufficiently large surface and do not limit too much the duration of the inunction we gain so great an acceleration and increase in its effect that it fulfils all the conditions of an efficient antisymphilitic treatment.

We have entered into this detailed account of the quantitative and qualitative significance of the absorption of the mercury contained in the grey ointment because it forms the foundation of our practical treatment.

We now pass to the consideration of the means by which the patient is protected from the injurious effects of the volatilised mercurial vapour. Whilst the rubbers *i. e.* the trained inunctors according to the calculations of Wings <sup>1</sup> are exposed only to very little danger and in spite of greatly prolonged occupation remain quite free from mercurialism, patients become ill in narrow rooms which contain but a small quantity of air and even those who are in their immediate vicinity may suffer from inflammation of the mouth. It is therefore necessary, besides covering the portions of the body which have been rubbed, to pay careful attention to the mouth and especially to provide the patients with large well aired rooms and to see that they have regular exercise. By this means nearly all danger is avoided. It is also important to maintain in a healthy state the skin by which alone the administration of the mercury should be carried out. A third indication is to preserve the sensibility of the organism to the specific remedy by the careful observance of certain general rules and to prevent toleration of the drug from taking place. We find these difficulties with other remedies than mercury, but in a less degree with iodide of potash. They may occur at every stage of the disease and are

<sup>1</sup> Loc. cit.



often troublesome, especially in cases of long duration. In spite of the continued use of the ointment the mercury for a time loses its power as a remedy and we recognise the occurrence of this by the cessation of improvement, by the existing symptoms becoming worse, or by the outbreak of fresh evidences of the disease.

The final indications are to render the patients secure against the after consequences of the specific remedy and with this object to improve the functions of those organs, the kidneys and digestive tract, which, according to our present knowledge, are the chief organs for the excretion of the incorporated mercury. It is true that the quantitative estimation of the materials excreted has not yet been made and we are yet unable to state this numerically how far we may be able to influence the regulation of the excretion. But at least we can recognise the probability of an overloading of the digestive canal with mercury temporarily taking place and the evident advantages of a restoration of its normal functions.

The preceding indications, with the exception of the first, which has been already discussed and bearing in mind our introductory remarks, are to be comprehended under a common point of view. For their proper fulfilment we require such remedies as will influence the entire organism as well as its individual parts and thereby favour the general nutrition, the circulation and the glandular activity. These remedies must also be capable of being adapted to the treatment of all cases.

Our thermæ fulfil these requirements in every way. More detailed accounts of the drink-cure, the inhalations, baths, douches and vapour baths as well as of their value both to healthy and diseased persons are given in other portions of this book. It remains for us only to mention the relations which exist between the different modes of application and the specific treatment.

To the drink-cure of 800 to 1000 grammes of the sulphur water daily we owe the improved appetite, the important increase in the excretion of the kidneys and the regularity of the bowels. The regular action of the bowels takes place in almost

every case. Where it does not take place we find an evening dose of castor oil the most useful remedy. We are convinced that inflammation of the bowels consequent on the use of mercury is more easily avoided the more regularly the evacuation of these organs takes place. If, however, inflammation occurs either through carelessness or as the result of an improper diet castor oil with the addition of opium forms the best remedy.

The warm baths on account of the quantity of soda which they contain greatly facilitate the proper cleansing of the skin from excessive or diseased deposits from the epidermis and glands. By its warmth and its mineral constituents the water makes the skin pliable, opens its pores and increases its normal action by stimulating the circulation. As the result of this the absorption and chemical transformation of the mercury in the grey ointment is favoured whilst the beneficial strengthening and hardening of the skin easily protects it against the occurrence of mercurial eczema.

The warm douches by the shock of the stream of water coming from a height have a powerful influence on the skin and muscular system which is evidenced by redness, slight swelling and increased perspiration. While the temperature of the douche can be suitably raised there are also proper appliances for giving cold sprays and douches in the baths cells.

By means of the vapour baths which contain the natural gases and the hot vapour of the springs we are able to produce free perspiration in a short time.

The combination of the douches and vapour baths, the latter taken best at intervals of ten days, have proved of the greatest value in numerous cases in guarding against the occurrence of toleration of the mercury or in restoring the sensibility of the system to the drug.

Finally, by the construction of our bath-houses, in which the rooms are warmed by the natural heat of the thermæ, the patients are protected against the effects of the weather and the external temperature. The specific treatment can therefore be

carried out at all times of the year and gives the same results in spring and summer as in autumn and winter.

The combination of the inunction cure with the use of the thermæ is equally valuable at all periods of life, in pregnancy, with sufficient care during the earlier months, and in complicated joint diseases as the best and most reliable treatment for syphilis in all its stages from the initial lesion which we consider as the first expression of the occurrence of the disease, through all the varying manifestations of early syphilis as well as of its later and, for the most part, local ravages. In contrast to the mercurial courses in such cases, in which the treatment is founded on a certain diagnosis, we must sometimes allow the inunctions to be conducted experimentally if in patients who have recently suffered from syphilis, indistinct but suspicious signs of various kinds manifest themselves or if other remedies are without effect.

These experimental mercurial courses are quite justifiable. They lose their empirical character as soon as the occurrence of improvement marks them as the necessary treatment. Yet contrary to the harmless thermal trial-cures quoted on the authority of Dr. A. Reumont<sup>1</sup>, they require to be more quickly given up if no result is produced. Careful regard to the general health, the gums and especially the proper maintenance of the body weight permit this mode of treatment to be carried out with sufficient security. For while it is the rule that increased body weight is an indication of recovery from syphilis by means of the Aachen treatment, if the patient has fallen off through the presence of that disease, if it should not be present there is a striking decrease in the general well being of the patient following the use of mercury in the absence of syphilis. The weight of the body also diminishes and ceases to do so only on the discontinuance of the treatment.

Besides the inunctions iodide of potash is also prescribed in connection with our baths. In the early stages of the disease we

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<sup>1</sup> Loc. cit.

use it only in those cases in which for any reason the mercurial treatment cannot be carried out, or where on account of further suspicious symptoms more prolonged treatment is necessary. On the other hand the later forms of the disease are the proper field for its supporting and accelerating influence on the action of the mercury. If patients complain of pains in the bones, if there are gummatous deposits that threaten to break down into ulcers or of which the destruction continues, if symptoms dangerous to life develop either in the brain or in any other important organ iodide of potash is in its proper place on account of its quick and energetic action and should be given in rapidly increasing doses up to 75 grains <sup>1</sup> daily.

But whilst recognising the magical results produced by iodide of potash we must not forget that experience teaches that the worst lesions may only slumber during its administration and we must not be betrayed by its power of causing the disappearance of symptoms into the belief that the disease has been extinguished. The early stages of central nervous disease, especially commencing tabes, with its paralyses which may quickly disappear on the exhibition of iodide of potash, often prove the deceitful nature of the remedy by a later and severe outbreak of the disease.

Also in the later stages of Syphilis we shall act for the best interests of our patients if, whilst recognising the value of iodide of potash in the treatment of the symptoms, we give the leading role to mercury.

When other signs are wanting iodide of potash may often establish the specific nature of an obscure disease. Yet even with positive results there is still the possibility of doubt just as we are not always justified in the case of a negative result in excluding the possibility of a connection between the existing disease and syphilis. Amongst other cases we can point at several of joint disease which were not at all benefited by the use of iodide of potash, but which were cured by a course of inunctions which

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<sup>1</sup> (5 Grammes.) — *Trc.*



were undergone in spite of the negative result of the former treatment.

The local treatment of syphilitic symptoms during the specific treatment claims particular notice. Both must go on *pari passu* and each must be the complement of the other. The local treatment must therefore be as perfect and efficient as possible. It takes its place beside the general treatment as an efficient supporting means whereby our efforts may be directed to those portions of the body in which the general treatment makes only slow progress. It also diminishes the danger of recurrence and opposes the liability of retention of the remains of the syphilitic poison both at its place of entrance as well as in its customary lurking places.

The thermæ form a suitable local means of treatment for ulcerous processes and excavated sores. We may also include the mercurial inunctions on account of their direct influence on the specific skin diseases, also the external application of iodine on account of its anodyne and absorbent properties. But strictly speaking we consider the topical treatment to consist in the application of mercurial preparations in various forms. We accordingly employ the emplastrum cinereum, which if properly prepared does not require the addition of empl. saponis, for the initial lesion, for glandular swellings and for syphilides of the skin; for ulcerations of the mucous membranes we select solutions of chromic acid, corrosive sublimate, &c.; in similar conditions of the skin we also employ iodoform in place of the rather worthless iodol, either pure or dissolved in ether or collodion, or in the form of ointment. We consider Volkmann's spoon indispensable in the case of broken down gunmata or badly cicatrised granulations. The extension of the disease to the osseous system, &c. requires important surgical measures which are beyond the scope of this work and which are fully discussed in special treatises.

The excellent results of the special treatment carried out in connection with our baths have quite put into the shade Zittmann's cure formerly so celebrated and so often prescribed and it is now seldom employed.



In the preceding pages we have endeavoured to give a clear account in general terms of the influence on syphilitic diseases possessed by our thermal and specific therapeutical methods. Many points have been touched on which are specially characteristic of Aachen, we do not think, however, we need enter more particularly into the special treatment or the regard paid to good, carefully chosen nourishment, daily baths and drinking of the waters, proper exercise in the open air &c. because we assume the knowledge of these matters is universal.

For the clinical diagnosis of saturation of the body with mercury, hydrargyrosis, we refer the reader to the section of this book which treats on chronic mercurial poisoning. The symptoms of the latter are often so similar to those of early syphilis of the mucous membrane of the mouth that a rapid diagnosis is difficult. In many patients it necessitates an interruption of the inunction cure, and is to be removed by the use of our warm mineral waters with the aid of suitable medicines.

On the conclusion of the treatment here, that is to say, after producing as far as possible a state of immunity from a return of the syphilitic symptoms, almost every patient asks us a question which could be better answered by his usual medical attendant, namely: how his future life is likely to be affected? Many also, who in their days of perfect health had put the thought of marriage far from them, now show a lively desire to run into the quiet haven of married life as soon as possible.

The answer to this question is by no means as simple as it may appear. Bearing in mind the uncertain nature of the disease we may say that a regular mode of life, sufficient rest at night, great moderation in the use of spirituous drinks, frequent baths, chiefly warm,—cold only for those accustomed to them or who require stimulation of the nervous system—are all undeniably important influences on the extinction of the disease. Moreover we think that as serious as every specific infection and its symptoms are to be considered, still syphilis in every stage can be extinguished and that it is not necessary that the disease should run

through all its phases from the most trivial to the most severe forms.

It is also our serious duty according to the individuality of the questioner and the character of his symptoms varying from mild to severe, to point out to him the possibility of recurrence taking place. Experience teaches that the earlier symptoms may extend over a period of several years, but suitable treatment and careful watching will bring the majority of patients to the wished for goal of perfect recovery within from one to three years, whilst the recurrence of the earlier signs of the disease seven or eleven years after infection which we have sometimes seen, is to be regarded as exceptional.

An exemption of at least two or three years from the earlier manifestations of syphilis must precede marriage.

The later forms of the disease are considered by many eminent authorities as incapable of conveying infection and we have seen many cases of late syphilis occurring in married men which had not proved dangerous to either wife or child. At the same time we cannot admit the absolute innocuousness of late syphilis as regards the family of the patient, for we have also seen the occurrence of the early infectious symptoms simultaneously with those of the later stages.

Bearing in mind the difficulty almost amounting to impossibility of presenting a complete survey of the disease in its entire extent we shall take nerve syphilis as affording amongst the later forms less doubtful results for discussion. All patients suffering from these forms of the disease after having had a course of treatment here of at least two and in many cases three or four months, after a pause of not more than one year should undergo a renewed course of treatment of no less duration. Many patients require treatment for several years.

In all cases we must recommend our patients to seek medical advice for any of the later manifestations of the disease. The physician will have to decide whether further specific treatment with mercury or preparations of iodine are necessary, or, whether

in view of still existing saturation with the specific remedy only local measures are required, or, whether an expectant attitude is indicated.

The uncertainty as regards prognosis would be slight, perhaps altogether removed, if we could be certain that by means of specific treatment during the latent period, that is to say during the period in which the patient is free from any symptoms, further outbreaks of the disease could be avoided. Unfortunately long experience has shown that the doubts expressed of this protective power of the specific safety cure have been justified. Nevertheless in the face of all the other remedies which have been so urgently pressed forwards, there remains no more suitable means for diminishing possible danger to wife and child than properly carried out courses of mercurial treatment best in connection with the thermæ. —

With this chapter on the treatment of syphilis in general the following chapters on diseases of the nervous system, tabes, diseases of the internal organs and eyes are naturally connected. These are of importance on account of the treatment and of the results attained especially by the Aachen cure during the last ten years and they have accordingly been discussed under separate headings. But since in the majority of the diseases just mentioned syphilis occurs as a proximate cause, the remarks in this section on the general therapeutics of this disease can always be referred to, as the treatment of the following pathological conditions bears a constant relation to that of the general disease and the latter must form its foundation.





IX

DISEASES OF THE NERVOUS SYSTEM.

BY

L. GOLDSTEIN, M.D.







ONE of the latest acquisitions in "Balneotherapeutics" is that special indications can be given for the use of baths. Formerly all or nearly all forms of disease known to pathology, with one or two exceptions, were considered suitable and capable of accommodating themselves to almost every form of bath.

To-day on the contrary each disease has its proper mode of treatment and particular forms of disease have their special form of bath.

There is naturally very much yet to be done before "Balneotherapeutics" arrive at the dignity of a science in the true sense of the word, and should they ever win the name of an independant science the foundation must be laid by observation and experiment on the living material, the principal instruments of progress, which can only be had at a bathing resort—and although physiology, pathological anatomy and microscopy have in this as in other fields of medical science cleared away errors and mistakes it is still to the practising physician at the baths that we must look for the building up of the science of balneotherapy.

Nervous cases have been sent to baths and especially thermal baths for a long time, although we are by no means clear as to their mode of action. It is said to be a peculiar influence of a chemical, mechanical and thermal nature which acts on the nerve endings in the skin and so brings about a reflex action. These

reflexes are of a different nature according to the strength and duration of the exciting cause employed: as, for instance, acceleration or retardation of the circulation—increase or diminution of the blood pressure—acceleration or depression of the action of the heart—of the respiration &c. These peripheral stimuli are transmitted to the central nervous system and react either in stimulating torpid function, or in moderating excessive action.

It is at least certain and has been proved by the experience of a hundred years that the cure or improvement of nervous cases has resulted from the use of thermæ of the most varied character. They are frequently cases of a very severe nature, chronic long standing conditions for which relief is sought here. It is therefore not to be wondered at that just in these cases especially if the central nervous system is involved a permanent cure is not to be expected and much indeed will have been gained if only improvement has been brought about.

It is quite true that in the last twenty years such progress has been made in the diagnosis of nervous diseases that it will well repay the trouble of collecting together the various forms as well as the results of treatment which have been recorded in Aachen during this new epoch. If one refers to the balneological writings of the older physicians one will find little of a satisfactory nature with regard to diagnosis, but it must be remembered that these works were written at a time when the knowledge of individual forms was not very far advanced. This alone excuses and explains any want of completeness in the setting forth of the chapter on nervous diseases even if it should not be remembered that this chapter itself is made up of short portions of articles which deal collectively with the various diseases which come for treatment to this place.

Our thermæ claim a remarkable position, which as regards the curability of nervous diseases expresses itself very much in their favour as far as the aetiological factor is taken into account and the syphilitic origin of the disease regarded as the point of departure of the treatment. The baths here serve chiefly as a

supporting treatment which is by no means of small value, for we have seen cases of nervous disease in which cures took place which had been treated by other means in vain for many years.

It is now my task to describe briefly the forms of disease of the nervous system which come under observation in Aachen. I desire by no means to write a symptomatology. That were indeed superfluous since we possess sufficient and excellent handbooks on the pathology of the nervous system from which information may be gathered on this head. My object will be better fulfilled, if, on the basis of fifteen years experience together with a constant sympathy with the new publications which treat of the wide and difficult field of nervous disease, as well as on the foundation of a number of peculiar cases, I draw out a somewhat general view of the nervous diseases which have been treated here with success. I cannot, however, avoid interweaving some pathological and diagnostic remarks which appear to me to be of special importance. A more detailed account in my opinion is not within the scope of a general work of this class, but belongs rather to special treatises, which, thanks to the industry of Aachen physicians, have been published extensively from here. These pages aim at none other than practical objects and they will have attained their purpose as a humble contribution to this work if, proceeding on the path of careful observation of patients, they point out the nervous diseases suitable for treatment by our baths.

## DISEASES OF THE PERIPHERAL NERVOUS SYSTEM.

### DISEASES OF THE SENSORY NERVES. NEURALGIAS.

Sciatica is the most important of all the neuralgias because it is the most painful and in consequence of this the most disturbing to the general health. We are therefore justified in beginning with it as it furnishes the largest contingent amongst the patients in this category. But since sciatica is properly speaking a collective name, a vessel into which various, though in many



respects similar conditions have been thrown, it is therefore more necessary in this than in any other disease to establish the cause of the suffering before one can think of the treatment.

Generally speaking one understands by the term sciatica all those violently painful conditions which occur from the region of the sciatic notch down to the outer side of the leg, the outer border and dorsum of the foot, but rarely to the sole of the foot. This pain may, however, be the result of the most various conditions. It may arise from a true neuritis of the sciatic nerve itself, from an affection of its sheath, a peri-neuritis from injuries, from compression by exostoses, tumours, &c. whereby again gout, rheumatism and syphilis are partly to be regarded as exciting causes.

But even if it be taken for granted that in given cases the true cause of the complex symptoms of sciatica is recognised with certainty it is still difficult to give definite indications for bath treatment even when admissible. We cannot always tell what special form of bath we should have recourse to, as Erb would wish. The question, for instance, whether baths of an indefinite or definite character should be employed can scarcely be given. Those cases especially which are quite recent do not require baths; it is better to treat these in the beginning with some of the much recommended internal remedies amongst which it appears ichthyol has quite recently been used with some success in certain "rheumatic" cases, it is only when the disease has existed for some time that one need have recourse to that potent remedy, the bath cure.

From time to time we naturally see in Aachen a great variety of cases but the greatest number rests on a gouty, rheumatic or syphilitic foundation. At the same time one remembers in every case that the suspicion of a central cause, especially an affection of the spinal cord is not necessarily excluded and one carefully examines in order to see whether under the aspect of lancinating sciatic pains incipient tabes dorsalis is not concealed.

At the present moment I am treating a gentleman whom I



have known for ten years and who contracted syphilis twenty-two years ago. His sufferings began with violent sciatic pains which chiefly attacked the left leg and in addition to this there was even then diminution of the knee reflex which was very weak and could only be elicited by the help of "Jendrassik's Handgriff". The pains were so violent that the patient was obliged to stay in bed for several days and was unable to walk a single step. A suspicion of incipient tabes dorsalis arose very early and was confirmed by the occurrence of incontinence of urine a few years afterwards. These are, however, the only symptoms which have come to light up to the present and yet there can scarcely be any doubt that the disease will take its course though probably a very slow one. In the case of this patient who five or six years ago suffered from very violent and frequently recurring sciatic pains the baths were much used here and almost always with the result that he was enabled to follow his arduous calling without much inconvenience—he was obliged to spend nearly half the year travelling.

A suspicion of a spinal disease forces itself on us especially in those long continued, frequently recurring cases and a syphilitic history should lead us to be specially guarded in diagnosis and prognosis. These cases of sciatica referable to syphilis which generally occur in the later stages of that disease, but which can occasionally be observed after the first outbreak of constitutional symptoms, naturally demand energetic anti-syphilitic measures in addition to the bath treatment.

Of the forms not complicated with syphilis I may be permitted to give the following instance briefly. Frau K. of Ringsdorf near Brühl had five living children and eight miscarriages with great flooding on each occasion. In the beginning of the summer of 1883 she had a sense of formication in the foot, abdominal pains and diarrhoea, her power of walking grew constantly worse, and since May of that year she slept badly. The optic reflex was good, and there was no giddiness with closed eyes. There were uncommonly violent pains at the pressure points of the sciatic

nerve. The patient goes on crutches since as she says "the right leg will not follow". There is no apparent atrophy of the muscles of this leg. The bath cure with the constant current was used. After a course of four weeks all her symptoms had disappeared. She could walk without any support. I have been unable to discover the cause of the neuralgia in this case with certainty.

The question as to what degree of warmth should be employed during a bath cure cannot generally be answered although a great number of patients at this place can bear baths of 28 to 30° R. very well. Yet pretty often very stout persons, especially ladies, have consulted me on account of sciatica, for whom in view of a possible accumulation of fat about the heart I have ordered the baths to be taken at a lower temperature at the commencement. The duration of the bath will naturally also vary with the individual, although prolonged baths of half to three quarters of an hour and more are well borne and of excellent effect, especially in rheumatic cases. One must be very careful with the douche as it not unfrequently happens that the pains are considerably increased by it, especially if the doucheur or doucheuse begins at once with the full stream. Some persons, such as the lady above mentioned, could not bear the douche at all and in recent cases its use is contraindicated. Combined with massage it often helps surprisingly, particularly in those processes which are connected with new formations and swellings.

Internal remedies are generally dispensed with though they are occasionally recommended to be used in doubtful cases. All my sciatic patients were treated with the constant current and the anode has been allowed to rest either on the vertebral column, the sciatic plexus, painful points, or on the sciatic foramen whilst the cathode has been held on the abdomen; I have sometimes also followed the course of the nerve downwards. In stout persons it is necessary to use large electrodes and a fairly strong current. In some cases Faradism also proves of much value especially when applied by means of brush electrodes.

I cannot conclude without mentioning a wonderful but well

established fact, namely, the continued influence or after effect of the baths. It has been observed here also by other physicians as well as by Lehmann at Oeynhausén, that sciatic patients after a five or six weeks course are sometimes sent away only slightly improved and that they become completely well only after they have had some weeks rest at their homes. I will not attempt to give any explanation of this remarkable phenomenon. It is sufficient that it really is so. Indeed during the completion of this article I have received a communication relative to the cure of a severe case of rheumatic sciatica with motor symptoms which I had sent away last summer only slightly better. After this patient had been at home for some weeks all his troubles left him almost instantly and have been absent up to the present with the exception of the pains in the neighbourhood of the sacrum. This patient on account of the nature of his calling is much exposed to wind and weather.

Though not of such frequent occurrence as neurægia of the sciatic nerve neuralgias of other nerves both with and without a syphilitic foundation are sent here for treatment and improvement. Those cases of trigeminal, occipital, intercostal, brachial and lumbar neuralgias in which the presence of some neoplasm of syphilitic origin dragging or pressing upon the nerve affected, may with some certainty be recognised as the cause generally promise the best results. In such cases the combination of the baths with the inunction cure brings about a very rapid and certain improvement. Above all electricity cannot be dispensed with as a healing factor. The constant influence of the anode or of the kathode may be employed or on the other hand judicious use may be made also of the Faradic current. It may indeed be accepted as certain that definite and peculiar disturbance of the nervous apparatus is concerned in the production of that neuralgia to which Mœbius has given the suitable name of "neuralgic changes" and which it must be our chief task to remove.

I wish to draw attention on account of its rarity to a peculiar neuralgia of the point and edge of the tongue, a trigem-

inal neuralgia which has occasionally come under my notice in old people and occasionally in cases of recent syphilis. In an old standing case the affection could be traced back to sensory disturbances of the lingual nerve and was not cured in spite of every effort. The patient was a merchant aged forty years who contracted syphilis in the year 1865 and who at that time went through a course of treatment at Aachen. I saw him in 1879, he complained of a peculiar pain at the point and round the edges of the tongue. He had come here on account of his previous syphilitic history. Nothing could be perceived objectively on the tongue nor could any other evidences of syphilis be discovered . . . The patient desired an inunction cure which was carried out, but without any result as regards the troublesome sensibility of the tongue. Disturbances of taste had never been perceived, but all highly seasoned food and every excess of temperature made the symptoms worse.

These recent cases are naturally much more favorable in which plaques are still visible on the edges of the tongue and may be regarded as the cause of the peripheral nerve irritation. In many cases the troublesome neuralgic symptoms disappeared simultaneously with the plaques.

#### DISEASES OF THE MOTOR NERVES.

Disturbances of the motor nerves come much more frequently under observation in our baths than those of the sensory. It is often uncommonly difficult to recognise the purely peripheral character of the "paralysis" on account of the long central course which the motor nerves take from the cortex of the brain downwards in the spinal cord. I may therefore confidently assert that the greatest number of the motor symptoms, spasms, paralyses and reflex phenomena observed here are of central origin. At the same time individual cases occur in which the purely peripheral nature can be proved with some certainty, though it may be either a paralysis of a peripheral plexus or of a peripheral nerve.



The evident anatomical origin is to be sought in inflammations, new formations or toxic influences.

Amongst the inflammations, paralysis due to cold, refrigeratory or rheumatic paralysis plays a principle part whilst besides lead paralysis, described elsewhere, the paralyses due to syphilis especially, and occasionally those due to diphtheria, typhoid, fever, small-pox &c. also require our attention. Often enough, however, we are unable to recognise a distinct anatomical foundation and, in such cases, as for example hysterical paralysis and that due to fright, we are compelled to speak of functional paralyses. Symptoms of failure of motor nerves are much less frequently the object of treatment at the baths than symptoms of motor irritation which we commonly call spasm.

For the individual forms of peripheral paralysis as shown in the paralyses of the muscles of the eye we must refer the reader to the paper of our colleague Dr. Alexander in a succeeding chapter. Those forms of facial paralysis depending on a rheumatic basis are seldom treated at the baths. On the other hand individual symptoms due to syphilis are for the most part dependent on a deep intra-cranial process. Paralyses of the muscles of the shoulder and back as well as of the upper and lower extremities are occasionally observed. Severe and slight cases divide themselves into two classes, those in which complete reaction of degeneration in the nerves and muscles is apparent and which, if they ever become cured must remain for months under treatment; secondly those in which there is only a paretic state in which the electric test is unable as yet to prove the existence of any degeneration.

I observed an interesting case of the latter kind in September 1886. A boy aged twelve years, from Erwitte in Westphalia, had fallen through the ice in the beginning of the year mentioned and was thus compelled to take a cold bath of very great intensity. For some days he was ill with pains in the head and stomach and weakness in the legs. Whether there was fever cannot now be ascertained. The paresis in the legs got worse from day



to day so that at last the little patient could move only with the greatest difficulty and with the help of crutches. When I first saw this wasted child I perceived the extremities to be cold and livid, sensation was everywhere well preserved even when tested by the electric current. On the other hand the muscles responded with only very slight contractions to both kinds of current, there was, however, reaction of degeneration. The tendon reflexes were quite vigorous. The extremities felt rather cold, at the same time the patient stated in reply to questions that he experienced a slight tingling in them. The right lower extremity was somewhat more affected than the left. On attempting to walk he was able to move forwards if supported, by causing a rotation of the hip joint and then trying to push out the leg with a dragging movement.

This condition which I recognised as a refrigeration paresis of the lower limbs, was completely cured by forty baths and the assistance of an energetic electric faradic treatment. The boy, who had to be carried to my house at the beginning of the course and was brought into my room only with great trouble, was able to walk to some extent even after fourteen days; after three weeks he dispensed with crutches and at the end of four weeks he was running about. The muscles of the leg had gained considerably in girth and reacted promptly to the electric current.

If one is certain that no spinal or cerebral mischief forms the basis of the paralysis, one must then use prolonged baths at a fairly high temperature in the treatment of all cases. The douche and vapour bath will also be used according to circumstances, but in no case must the use of the most important remedy, electricity, be delayed. It is to be used chiefly in the form of the faradaic current. This in combination with the baths of this place obtains a real triumph. As is well known, it is of the highest importance in this class of disease to distinguish between slight and severe affections. Regular massage combined with the warm baths is also of use in certain cases. In those which are complicated with syphilis anti-syphilitic treatment is naturally in its proper place; mercury and iodide of potassium are here sovereign remedies.

The prognosis is favorable in those cases which can be referred to a rheumatic or syphilitic origin and in which no deep degeneration of the muscles supplied by the affected nerves has occurred; but if injuries or non-syphilitic tumours involving the nerve or its peripheral distribution are the cause of the neuritis the prognosis is then very doubtful. Both these forms will require the intervention of the surgeon.

This is perhaps the most suitable place to say a few words on a disease of the peripheral nerves which, particularly in its later stages when regenerative processes have taken place, seems very susceptible of treatment by means of the thermal baths. It is that affection which has been closely investigated and carefully described under the name of "multiple neuritis". This is, perhaps, due to infection, as Scheube, amongst others, has shown in the case of beri-beri and after the acute stage has been gone through safely, I can promise a very beneficial effect from the prolonged use of our baths, particularly in the case of motor paralyses. I have no striking case to bring forward at present, the disease being of rare occurrence, but some recent observers, amongst others Strümpell, Löwenfeld and Pierson call attention to the effect of the baths. The authority last named writes "whether in the case of retarded convalescence we should try the warm baths of Teplitz, Wildbad, Ragaz, the sulphur baths of Nenndorf and similar places or the brine thermæ of Nauheim and Rehme can only be decided by observation. Cases of toxic paralysis, such as that caused by lead poisoning or the chronic abuse of alcohol, show that the Aachen thermæ have a specially favourable influence on this class of neuritis. I will briefly refer to the chronic neuritis of the drunkard as some characteristic cases have come under my notice. Whilst formerly the nervous disturbance produced by the abuse of alcohol was considered by Leudet and Huss as chiefly proceeding from the spinal cord and though no doubt in recent times an influence of that kind has been demonstrated by G. Fischer, yet it is to the works of Lancereaux, Moeli and others that we are indebted for the knowledge that by far the greatest number of chronic al-

coholic nervous disturbances are due to a chronic neuritis. In the early stage there is a certain resemblance to true, typical tabes from which it is not very easy to distinguish it. Krüche observed seventeen cases of "Pseudo-tabes" amongst which was that of a lady. These were all neurotic drinkers who sought in alcohol a source of forgetfulness of nervous troubles of the most various kinds or because, as the result of a reflex neurosis of the mouth the gullet or the stomach, they were deceived by a strong sensation of thirst. In contrast to the symptoms of ordinary drinkers the abuse of alcohol is attended by lightening pains, a feeling of weariness, giddiness with closed eyes &c. of a more strongly marked character. The tendon reflex was wanting in ten cases. Ophthalmoscopic examination showed the papilla to be saturated with white colour in three cases, in nine the veins were more distended than usual. The treatment in the first instance consists in stopping the abuse of alcohol, in the application of constant ascending currents to the spinal cord and the principal nerve trunks of the lower extremities, these, as well as faradaic electricity to the affected muscles remove the ataxic symptoms in from four to twelve weeks.

The differential diagnosis is of great importance, the girdle pains, reflex fixation of the eye-ball and disturbances of the bladder are absent in most cases.

One of those cases which I have in mind was in the early stage. The patient was a doctor of chemistry in whom irritating pains in the thigh and knee joint and slight ataxic disturbances of gait as well as cramps in the calf of the leg, occurring chiefly at night on the slightest provocation, had existed for three months. The patellar reflexes were very weak although they could still be called forth. The patient's face was congested and his pulse rapid. I regarded the affection, from which he suffered uncommonly severely, as the consequence of excessive use of alcohol for many years, and during his stay here I was able to convince myself how difficult it was for him to give it up. Warm baths 28° R. brought about a decided improvement, but no cure,

as the patient, who was in other respects an intelligent man, paid no attention to my recommendation that he should entirely forego the use of alcohol. Douches were badly borne.

In another case the affection was much further advanced and it was only by the most careful examination that we succeeded in distinguishing it from typical *tabes dorsalis* and were accordingly able to give a more favourable prognosis. The patient was a gentleman aged 53 who had been addicted to alcohol for a very long time but who energetically denied any syphilitic infection. Ataxic symptoms had appeared two years previously whilst gastric crises occurred five years ago. The patellar reflex was absent on both sides and the superficial reflexes were very weak, whilst Romberg's symptom was very distinct. There was formication in the hands and feet, but there was no girdle sensation, disturbance of the bladder, or reflex affection of the pupils. He had all the appearance of a tabetic patient, but by the simultaneous use of the induced current together with daily baths at 27° R. we succeeded in bringing about a decided improvement in all the symptoms. He gave up alcohol. Unfortunately I cannot say whether the improvement was maintained as I heard nothing further from him after he left here. But the improvement, which was almost a complete cure, took place so quickly that, bearing in mind the absence of convincing proofs of *tabes* and especially the alcoholic history, I considered the diagnosis of *pseudotabes alcoholica* as established. I must, however, not omit to mention that I saw no return of the patellar reflex.

## FUNCTIONAL NEUROSES.

Generally speaking functional neuroses have been seldom the subject of treatment at the thermal baths; but of this very class of nervous diseases (where hitherto we were content to dispense with an anatomical foundation and where a certain molecular change in the interior of the nervous substances is accepted as



the cause) on account of their obstinacy and constancy of these affections our present nervous, overstrung age every year sends us a constantly increasing number. For if a watering place has once gained the reputation of improving or of occasionally curing cases of nervous disease cases of the most varied kind take refuge to it.

The warm baths distinctly benefit a certain class of hysteria. I refer to that which is complicated with paralysis and which is accordingly to be included amongst the severe forms. Not infrequently a cure is accomplished by means of protracted warm baths in combination with massage and electricity.

According to the views of the present day I consider the attempt a total failure to prove hysterical affections being produced by alterations resembling those of syphilis of the brain. There is no doubt that hysterical symptoms are seen in a by no means small number of patients suffering from syphilis of the brain or spinal cord but these symptoms are only a complication and have nothing to do with the anatomical changes induced by that disease. From this point of view I should like to know how Moravczik's case just published "Hysterical symptoms due to Syphilitic changes in the Brain" has been established as well as the case of Guinon "Mercurial intoxication" inaccessible to me but quoted by him and that of Gilles de la Tourette Syphilis Rumpf's observations, on page 273 of his well known work on which Moravczik relies, relate only to the differential diagnosis between hysterical, neurasthenic and cerebral syphilitic symptoms. Erlenmeyer very properly draws attention to the "occillating" of the central symptoms in syphilitic disease and says at the same time that from the fact that the symptoms of hysteria are changeable, ephemeral and freakish it by no means follows that all changeable, ephemeral and freakish symptoms are to be considered hysterical. What we have said here with regard to the relation between syphilis and hysteria holds good in the case of hysteria and other organic diseases of the brain and spinal cord. Thus Ludwig Felderman in his "Dissertation" describes a case of multiple sclerosis (from



Kussmaul's former clinics) in which during life the symptoms merely of severe hysteria could be noticed. The autopsy disclosed the sclerotic foci and Felderman is of opinion chiefly on the authority of Charcot, that a complication of that kind is by no means accidental and that the sclerosis followed rather in the footsteps of the hysteria. Charcot, as is well known, has stated that after a long standing hysterical paraplegia sclerosis of the lateral columns may arise. In spite of this we can at present regard hysteria as only an accompanying symptom of the organic diseases if both should occur at the same time. In the differential diagnosis between hysteria and multiple sclerosis difficulty will frequently arise although the recognised text books do not say much on this point. It happened so with me in the case of a fine young girl of twenty-one years who was sent to me by my colleague Dr. Brandis for examination and electric treatment. There was no hereditary predisposition. The first shock appeared to give rise to violent emotion. In her early childhood a very transient diplopia had been present. At the time of the examination there was also fully developed hemi-anæsthesia of the left side and hyperæsthesia of the right side involving the face, body and the upper portions of both limbs. There was also mastodynia and ovarian pain; paræsthesia in both hands and in the fingers; a sense of heat in the left leg which was formerly paretic but is now healthy. There was paresis in the right leg and to a less extent in the right arm, the motor power of the latter was also weakened and there was increased reflex excitability of the whole right side. Increased tendon reflex was present on both sides, but ankle clonus was apparent only on the right. The right upper arm was  $1\frac{1}{2}$  cm. thinner than the left. There was very slight intentional trembling so that the possibility of real trembling from weakness remained. No giddiness. Temperament slightly melancholic.

As in the beginning I did not think of the simultaneous occurrence of two affections it was very difficult for me to discriminate between: multiple sclerosis and hysteria, I decided in favour of hysteria on account of the hemi-anæsthesia, mastodynia and

ovarian pain. The further history of the case which was observed away from Aachen and was communicated to me by the relations showed that there was no doubt that mutiple sclerosis was present as well as hysteria. There could be no possibility of the multiple sclerosis having developed after the hysteria. Both affections were present almost at the same time, indeed it is possible that the sclerosis had appeared first. There has been no autopsy up to the present. All the various therapeutical measures: baths, electricity, &c. &c. had proved themselves only of transient service. The disease took its well known gradual course. It is evident that differential diagnostic discussions of this kind are of great importance as regards eventual therapeutical progress and in this I trust this digression will find its excuse.

The fashionable disease "neurasthenia", with which may be included all those conditions of abnormal excitability of the nervous system which lead to exhaustion and loss of the power of movement, is occasionally as much the object of thermal bath treatment as hysteria so nearly related to it. Generally speaking the water cure is best for these conditions, yet I have seen cases of so-called neurasthenia sexualis which were decidedly improved by the careful use of these thermæ.

To this class belong those rather numerous patients who through fear of having become infected with syphilis have become really ill and pass their lives in a state of constant anxiety for which there is no real cause. Not unfrequently we have to do with true hypochondriasis; occasionally the syphiliphobia is to be regarded as the expression of a true psychosis—most of the patients, however, are neurasthenics the over excitement of whose nerves and ideas quickly disappears under suitable treatment. Neurasthenia is an affection which is cured neither by the physician nor by medicine, but in which confidence in the physician and his methods plays the principal part. Rest, a changed mode of life, removal from household cares, the knowledge that a cure is being effected, climate, &c. are the great aids.

Chorea, athetosis, indeed even paralysis agitans are occasionally

seen here, but the bath results in such conditions are very uncertain and that treatment would harmonise better with other indications.

## DISEASES OF THE SPINAL CORD.

It is an undisputed fact that warm baths can be of much use in a number of important disease of the spinal cord and its membranes, although opinions are still much divided as to the degree of warmth at which the water should be employed. The manner in which the healing action of the baths takes place can only be conjectured and all the fine theories of stimulating—and if need be of soothing—the nerve endings to react on the central organ are of little importance in the face of the experience that a favourable influence is very often unmistakable. That is naturally the case with all thermal baths—in ours, in most cases the previous history of the patients compels us to bring into the field with all possible energy still other healing factors and to regard the baths as very powerful adjuvants to the treatment of these persons. The constitutions of these patients make it clear that in most cases we may beneficially employ a higher temperature than usual.

In a small brochure on the Wildbad thermæ Th. v. Renz states that as regards the results of treatment in spinal cases we are to consider:

1. whether we can remove any pressure caused by exsudation;
2. whether we can reach the exciter of inflammation or tumour formation [syphilis] with remedies which will destroy it; and finally
3. whether the conducting fibres which have been put more or less out of connection with their nutrient centres are not so much degenerated thereby that the new tissue formed in the place of the degenerated fibres obliterates, so to speak, the tract which is finally destroyed.

Besides these general remarks some of another nature may still find a place here. Although, in view of the practical purpose of this work, we have endeavoured to avoid entering into pathological or anatomical details and to abstain from theoretical speculations, yet on account of its practical importance we will give briefly two different views on the genesis of the syphilitic diseases of the spinal cord which are most interesting to us here. In the first place Rumpf considers that syphilitic diseases of the nerves in general and of the spinal cord in particular always proceed from the vessels and he includes them with the granulation tumours which are characterised clinically by syphilitic infiltration of the connective tissue of the capillaries and of the vasa vasorum. In rare cases they lead to the formation of tumours which, in a certain stage of degeneration, are called gummata. The syphilitic infiltration of the connective tissue capillaries causes for the most part only local changes, rarely general disturbances. The infiltration of the vasa vasorum, besides causing disturbances of the general circulation and the consequent general injury to the nervous system, may also give rise to local disease in two ways. First, by the region of the nervous system supplied by these vessels becoming destroyed in consequence of their obstruction and secondly, by the rupture of the diseased vessels causing hæmorrhage into the actual seat of the disease. The hæmorrhages, or softening, occurring in consequence of syphilitic infiltration of the vessels are, however, secondary symptoms.

The second theory which we give here on account of its therapeutical importance is not nearly so generally received as the above and relates only to a certain class of spinal cases, the syphilitic nature of which has been recognised only in recent times. It is, however, in some respects contradictory of Rumpf's views. Strümpell in the second edition of his text book puts forward the hypothesis "that through the influence of the syphilitic infection a poison may be formed which has an especially deleterious influence on the affected system of nerve fibres" and Mœbius recently attempted to support this idea by an analogous conclusion:



“but these nervous affections themselves are secondary ailments which follow the infectious diseases at longer or shorter intervals, as for instance, paralyses, &c. after diphtheria, and ataxia after various other diseases. It is more certain, however, that tabes is the result of syphilis rather than progressive paralysis”. Strümpell recently tried further to strengthen his hypothesis and compared tabes especially with that condition of the nervous system which often follows diphtheria in which the direct influence of the bacterium is not concerned, but a chemical poison. Rumpf’s contradiction is not quite intelligible viz: that if the chemical poison was the cause of tabes syphilitic relapses must have an extremely unfavourable influence on the tabetic symptoms; he accordingly upholds the theory of vascular disease. As regards therapeutics the Strümpell-Möebius’ theory leads to the conclusion that treatment cannot effect the regeneration of the once destroyed nerve bundles, but that anti-syphilitic measures may check the progress of the tabetic process because they limit the conditions necessary for the continued action of the poison which produces the nerve degeneration. In the beginning of the disease especially, patients energetically treated by anti-syphilitic remedies show a remarkable arrest of the affection in the succeeding years.

This hypothesis may naturally be applied to diseases of portions of the spinal cord other than those of the posterior columns (which are described by Dr. Mayer in another chapter of this work) in so far as they are the result of syphilis. For this purpose I have alluded to it in this introduction to some diseases of the spinal cord yet to be described.

We now pass to the consideration of some specially important forms. In view of the hypothesis of Renz already quoted, (the acceptance of which is quite permissible), with reference to the effect of the baths on most of the diseases mentioned here, it can only bring about an improvement which is at least a great gain for the unhappy sufferers but one can speak of a true cure only when the syphilitic foundation is really recognised. Indeed science can now cure many cases which were formerly considered incur-



able, or can at least modify the sad prognosis. This, writes Erb, is especially due to electro-therapeutics, but a share in this progress is not the less to be ascribed to balneo-therapeutics which in recent times have received a noteworthy impulse in their scientific aspects.

The thermal water-cure is rarely employed in acute inflammation of the sheath of the spinal cord, nor is it in the chronic form, the so-called leptomeningitis spinalis chronica, if it is diagnosed as primary. On the other hand the conditions resulting from a meningeal apoplexy demand occasionally the use of warm baths; as to the temperature at which they should be employed no general rules can at present be given.

I have occasionally found good results from the thermal treatment of concussion of the spine, *Commotio spinalis*. Since the anatomical foundation of these, often very severe, symptoms cannot at present be established, and since it is well known, especially in forms caused by railway accidents, [railway spine] that we not unfrequently have to do with exaggerated, perhaps, even simulated sufferings the diagnosis cannot always be easy. It follows therefore that a number of the cases of functional neuroses (Neurasthenia, Hysteria) are very similar; the general identity of these affections, with hysteria for instance, as Charcot says, has recently been combatted with success by Oppenheim.<sup>1</sup>

The first case which I will report occurred in the year 1881. A gentleman had fallen so violently on his back on the ice that he was obliged to lie still for an hour before he could be carried home; afterwards he became quite "stiff". His physician pronounced it to be concussion of the spine and treated him daily with electricity. In 1882 the patient went through a four weeks bath-cure here with the result that the stiffness in his legs was diminished although he was not yet quite well as "the power over the limbs" was still wanting. When I saw the

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<sup>1</sup> Traumatische Neurosen.

patient for the first time, besides painful pressure points in the lumbar portion of the vertebral column, there was a motor weakness of both lower extremities. The four weeks bath cure (baths at 28° R.) combined with the use of the constant current applied to the back and the induced current to the extremities completely cured the patient.

The second patient had been only once to a "cure" here and although he had concussion of the brain at the same time he bore warm baths very well. Although one could not speak of recovery yet the condition, which had lasted already for six years in spite of every other kind of bath (Rehme, Meinberg), now gradually improved. This gentleman aged 33 had been in a railway accident in January 1887 and lay buried in the *debris* of a collision, when he was drawn out he heard what was going on around him without being able to speak; his speech soon came back again, but his gait remained impaired and he was unable to write. He had a sense of pressure on the head, weakness of memory, difficulty of hearing with both ears, sleeplessness, and jerking in the hands and legs. The patellar reflexes were good on both sides, but stronger on the right than on the left. The vertebral column was painful on pressure in many places. There was marked giddiness with closed eyes. Formerly he could not walk in the dark, now he can do so well. He cannot stand on one leg. He had hyperæsthesia of the right side of the back and right breast: ataxic gait. The left leg was somewhat thinner than the right. The tactile circles were much greater in the left lower extremity than in the right in which they were also enlarged. The electric excitability of the nerves and muscles was diminished on the left side, but there was no qualitative change; the functions of the bladder and intestines were normal.

Improvement took place in this decidedly severe case in the course of time and I have referred to it here merely in order to contradict the idea that the baths have an injurious effect on such conditions. Erb, for instance, considered baths at a high temperature as decidedly injurious, and Strümpell also advises that they should

not be used in such cases. The cases first referred to contradict this; in the first case in which there were no complications a perfect cure was attained, and in the second, a severe case complicated with concussion of the brain, the thermæ had at least a beneficial effect. I cannot at present classify the manifold forms of traumatic concussion sufficiently so as to point out the cases for which the Aachen treatment is specially suited.

Practically the most important spinal diseases as regards the thermæ are those forms which are included under the term chronic Myelitis. Generally speaking, according to Erb, an increased temperature of the bath produces a more exciting, and a lower temperature a more soothing influence. Nevertheless the indications for treatment are most difficult to state precisely since there is a very complicated process concerned in the disease in question. If one considers that simultaneously with the symptoms of paralysis, irritable weakness may also be present in a high degree, and that the entire nervous system shows itself in many cases most irritable and excitable it can be understood how difficult it is to give those so generally desired indications. The special, and to a certain extent pathologico-anatomical, distinctions place us also on a dilemma. "It appears to me", says Eulenberg, "to have but little foundation in fact, if one says that patients with spastic symptoms for instance, must be treated at places apart from those who suffer from tabes dorsalis. We know quite certainly that a process of an essentially analogous nature is involved, and yet we cannot tell whether this process goes on in certain tracts of the posterior columns, in the pyramidal tracts or in other regions of the spinal cord". We recall once more in this place the introductory views of Renz already mentioned with special regard to the curability of spinal affections and add that he has spoken in the following manner concerning Myelitis: Every transverse myelitis is the object of treatment only so long as it shows symptoms of irritation together with those peculiar to the onset of the disease. But the latter must either be on the decline or have been stationary for some time before the patient can be sent to

the thermæ. The symptoms of irritation must have a stationary maximum and must show varying oscillations and increase of both is an absolute contraindication. It is only when there is a stationary condition of the symptoms of the attack together with a stationary maximum of the symptoms of irritation that an experimental "bath cure" under experienced medical supervision is allowable.

In all cases the most important point is to keep the patient under the closest possible observation and since every case has its own peculiarities, so every patient will require a different method of treatment. Routine treatment is quite out of place here, even the temperature to be employed, which is so much in dispute, cannot be fixed for all; every one may state his experiences but a system can hardly be deduced from them. We in Aachen must therefore consider that the syphilitic history of most of the patients of this class whom we see here compels us to employ specific remedies, as well as the bath treatment, and perhaps, as already stated above, the reason lies in this that we may use with good results a somewhat higher temperature than is used elsewhere. My experience also shows that in the greatest number of cases baths of  $28^{\circ}$  R. and over will be well borne. At the same time I begin very carefully, according to the nature of the case, with baths of very brief duration (10 minutes) and gradually increase the time. I have never allowed the bath to be prolonged beyond half an hour and have very frequently ordered it to be taken only every other day, especially in the case of debilitated persons. The prescription which Strümpell gives for cases with prominent spastic symptoms, namely: to continue the baths for an hour or more, may be right with the temperatures employed by him ( $24-26^{\circ}$  R.) and occasionally for simple warm baths, but in the case of other thermæ I should advise against their use. I never use vapour baths with this sort of patients and douche baths only seldom. A free use is naturally made of electricity especially in the form of the constant current.

Even with the use of the inunction cure and iodide of potash



and with long continued periods of rest it is possible to check the progress of the disease only in a certain number of cases, especially when sclerotic processes have commenced. But when this is not the case and the disease rests on a syphilitic basis one has often enough an opportunity of seeing the disturbed functions fully restored. One must not, however, hold out the hope that a four or six weeks course of treatment is sufficient! As we shall see later when speaking of brain diseases, energetic antisyphilitic treatment of many months must be employed in the case of affections of the spinal cord.

It is evident from what has been already said that in multiple sclerosis of the spinal cord, which is almost always associated with a similar condition of the brain, much may be expected from the bath treatment. In this disease, with its slow development and prolonged duration, a syphilitic origin has not yet been satisfactorily demonstrated so that inunction and bath treatment seems scarcely justifiable. On the other hand we occasionally see patients here who present the complete picture of the so-called spastic spinal paralysis (Erb, Charcot) and in the case of whom the suspicion occurs that long standing syphilis is not to be altogether excluded as a cause. It is well known that sclerosis of the lateral columns seldom occurs in an uncomplicated form, but is frequently accompanied by sclerosis of the posterior columns or an affection of the gray anterior horns of the spinal cord. However, if the symptoms of spastic spinal paralysis are pure, that is to say, if they consist only of the recognised motor signs with increase of tendon reflex and show no other tabetic symptoms or any muscular atrophy (amyotrophic lateral sclerosis), then, if there be a history of previous syphilis, the prognosis is not so unfavourable.

With an energetic inunction cure and the use of long continued baths of from 27 to 28° R. we not at all unfrequently see a distinct improvement at least in the motor disturbances. Indeed, the introductory remarks also apply here and one feels no compulsion in considering the Strümpell-Möebius hypothesis of a chemical



poison as equally applicable to the lateral and posterior columns. I refrain from quoting individual cases since, according to my opinion, this is of no especial value because it would be necessary to follow up the course of these cases with their intermissions extending over very many years and because for reasons beyond our control this can be accomplished very rarely.

It is not inconceivable that a cure may be attained by baths in severe lesions resulting from progressive spinal muscular atrophy the anatomical foundation of which is to be sought in an affection of the ganglion cells of the anterior cornua with an intact condition of the pyramidal tracts and atrophy of the anterior roots of the peripheral nerves. We are, therefore, also inclined to take the opinion of Wetzlar, into which he has been misled by a few observations: that progressive muscular atrophy can be arrested and even cured by the Aachen sulphur thermæ, and modify it in so far as this: that in some cases of non-spinal form (and there may without question be such) by careful treatment with warm baths, massage and electricity an improvement of the nutritive conditions in general and of the muscular atrophy in particular may be brought about. It is of course quite a different matter if previous syphilis can be postulated as the cause of the spinal disease, for in that case we have probably to deal with a chronic myelitis in which such trophic disturbances are not unfrequently to be noted. The examination by electricity must decide here whether we have to do with deeply degenerated muscles, that is to say with those in which the complete reaction of degeneration exists, or whether an atrophic condition of the muscles depends only on a depressed state of the general nutrition or on a want of exercise. In the first form according to the axioms sketched in the introduction, one expects that since the gray anterior cornua, or the anterior root fibres are atrophied there will be no restoration as the result of baths or inunction treatment, in the latter form one will not unfrequently find a complete restoration of the affected muscles by means of these remedies in combination with other means (iodide of potash, electricity, massage).

In the great uncertainty which still prevails regarding the etiology of a great number of diseases of the spinal cord the practitioner will not so rarely meet with the question: whether previous syphilis is to be considered as the cause? I, therefore, expressly state that in all forms of disease of the spinal cord (including those not specially considered here) should there be any suspicion of syphilis the Aachen treatment appears justifiable. There are still such a number of obscure and severe diseases which torment and render mankind unspeakably miserable for many years that it is only natural to seize on any remedy that promises a result. But experience teaches that many patients, already given up as lost, have been restored to the families and mankind through a generous use of the Aachen cure.

If one can decide with certainty the syphilitic character of the symptoms, as is sometimes the case with new formations and tumours of the spinal cord, there is then the greatest prospect of success. The compressing structures which limit the space within the spinal canal may have their seat in the coverings of the spinal cord or in the cord itself; there may be a diffuse syphilitic thickening, or even a gumma or the symptoms may be of a milder character, the so called "root symptoms" or again very severe symptoms may present themselves, yet with a correct diagnosis and a corresponding suitable and energetic treatment the physician in most cases meets with satisfactory results. It is not to be wondered at that amongst these patients who come hither for examination and treatment we sometimes see the complex symptoms of Brown-Sequard's spinal paralysis which the so called unilateral lesion of the spinal cord presents and which are so interesting both physiologically and pathologically. A case in which considerable improvement has already taken place is still under my care and I will briefly refer to it in this place on account of the interest which such conditions always possess:

Mr. X. of London aged 31 years contracted syphilis in 1884. At the end of that year his throat and skin were affected. At the end of 1886 he thought himself quite cured. About this time

he had a fall from his horse with rupture of a tendon in the right foot. In February 1889 he found that walking became difficult, he was easily fatigued. Sexual power was weakened; he could not retain his urine and diarrhoea occurred so suddenly that he frequently wetted his clothes. At night spasms occurred in the right foot, the perception of differences of temperature was destroyed in the left. Constipation occurred later. At the end of March 1889 the patient came to Aachen for the first time and went through a three months course with the result that his gait improved and the spasms quite disappeared. During August and September of that year he went through another course. In January 1888 he rode a good deal whereby the spasms again came on though in a weaker form.

I saw this patient for the first time in April 1888. He was slightly built, the tendon reflexes were increased on both sides, there was slight paresis in the right leg whilst differences of temperature were absolutely not perceived in the left, sensibility to pain on pricking with a needle was greatly diminished. The impression produced by the induction current was also weaker on the left side than on the right, whilst the muscular contraction on the contrary appeared to be weaker on the right. The blunted sensibility extended up to the sternum following the middle line and was also evident on the left side of the penis. The musculature of the right leg was smaller than that of the left, the difference being 1 cm. between the thighs. The reflexes on tickling were active, but somewhat weaker on the left side. There was no ankle clonus. At the level of the last dorsal vertebra on the right side the well known anæsthetic patches were present. His sexual vigour was distinctly impaired. Inunctions and the bath cure (baths at 28° R.) were combined with electric treatment. When the patient presented himself again in November 1888 and began a new course of treatment there was only a very slight motor weakness in the right leg. The sexual functions were much improved, but the anæsthesia on the left side was unchanged. The paralyses of the sphincters had disappeared some time previously.

It was difficult to decide in this case whether we had to do with a gumma or with old standing circumscribed myelitis with consequent formation of a sclerotic patch, nevertheless some compression of the spinal cord must have given rise to the symptoms of a unilateral lesion. It may, however, be fairly admitted that the timely commencement of treatment warded off the occurrence of "secondary degeneration".

### DISEASES OF THE BRAIN.

Amongst the diseases of the brain which come under observation and treatment in Aachen, unless we err, we have to do only with an affection the cause of which is traceable to an earlier or recent syphilitic infection, and which occurs in very many forms and occasionally involves entire lobes of this important organ.

It has been observed in recent times by many of the physicians here that there is a steady increase in the syphilitic diseases of the nervous system and in particular of the brain. At any rate the number of patients of this kind is out of all proportion to those symptoms arising out of syphilitic diseases of other organs. It is of course possible that the latter are now more frequently treated at home than formerly since the generally favourable effect of mercury has been recognised, it is also possible that the increased demands of life and the pursuit of gain which especially calls for mental labour and strains a man to the utmost unless he is to succumb in the struggle for existence, it is exactly these causes so productive of "nervous irritation" which make this weakened and always most sensitive organ so susceptible of the influence of the poison.

Gerhardt says that "diseases of the brain may originate in a great variety of ways: the most simple is through injuries; then through the creeping in of the causes of disease through the places of entrance and egress of the vascular nerves; through disturbances of the nervous functions which react on the brain; through hereditary predisposition,



—but of all the diseases by far the greatest number, at least of those which specially interest the private practitioner, are dependent on changes in the circulation in the brain. In particular almost all those diseases which are dependent on infection must reach and influence the brain by this path. It cannot be wondered at that the blood vessels themselves should be first infected by the disease. It is well known to how great an extent the knowledge of the minute arrangement of the arterial system of the brain (which was first studied by Heubner whose results were confirmed by Duret) has advanced the better understanding of syphilitic diseases of the arteries of the brain. Heubner remarks: that in the basal region the terminal arteries predominate, whilst in the cortical region the anastomotic system prevails to a decided extent. In the former obstruction of the circulation naturally takes place more easily and has its result in softening of the brain substance whereby the severe, long lasting symptoms (Hemiplegia &c.) are explained. In the cortical region the obstruction even of a larger vessel does not exercise so intense an influence on the duration of life, the symptoms are generally of a transient nature and the passing apoplectic attacks which accompany the beginning of syphilitic disease of the brain are thereby explained. It is well known, as already mentioned, that, according to Heubner, the vessels of the brain are attacked by syphilis from the very beginning, whether this as he insists, has issue in a disease of the intima, or as others say of the media or adventitia has no special importance as regards the clinical aspect of the case; it is enough to know that the vessels in very many cases are directly responsible for the infection and appear to be its only carriers.

Apoplectic or apoplectiform attacks occupy the first rank amongst diseases of the brain here. Gerhardt appears indeed to permit pretty wide acception of the connection between apoplexy as a symptom and syphilis as the cause. The apoplectic attack is generally followed by paralysis of one side. A certain number of these apoplexies are to be traced to the previous formation of aneurisms, which frequently occur in the optic lobes, centrum



ovale, cerebral peduncle and medulla oblongata. The recent greatly extended knowledge of cerebral localisation naturally lends important aid to the understanding of the symptoms produced by the hæmorrhage into these regions. The work done in this connection, (as for example, the pioneer researches of Fritsch and Hitzig on the motor and sensory regions) is thoroughly well known and has been collected by me since that time in "Schmidt's Jahrbücher". We may also here refer to Nothnagel who in an excellent treatise endeavoured to apply the newly discovered clinical and experimental facts to "A Topical Diagnosis of the Diseases of the Brain".

Amongst the paralyses occurring in apoplexy those of the eye muscles occupy a prominent place, and moreover as we are now fortunately able to submit to examination the vessels and nerves of the fundus oculi, which form the only visible terminal expansion of the vessels and nerves of the brain, so in no case of brain disease should one delay to send the patient to an expert ophthalmologist. Our colleague, Dr. Alexander has described in the clearest manner all that interests us with regard to this point in his book "Syphilis and the Eye" and since he has also treated the subject briefly in this conjoint work we therefore refer the reader to the chapter which he has contributed.

Though we share in general the view of M. Rosenthal that a further accumulation of pure casuistry only increased the literary embarrassment which the contemplation of this increasing ballast inspires, in spite of that we will attempt, by means of the history of some patients, to demonstrate the curability (of these diseases) with special reference to the methods of treatment at these thermæ. Whatever modifications it may have to undergo as regards topical diagnosis as the results of the above mentioned publications, I happen to have published a noteworthy case of cerebral syphilis in the "Centralblatt für Nervenheilkunde" 1886 p. 296.

Herr X. of Leipzig aged 30, contracted syphilis in 1878. A year later secondary symptoms showed themselves: roseola on

the breast &c. At the end of 1884 he was slightly affected mentally, there was melancholia and for six weeks he was aphasic. In 1885 he underwent the inunction and bath cures for the first time when his symptoms disappeared. At the end of that year a fresh apoplectic attack took place followed by aphasia and slight paralysis of the left arm and leg. The patient is left handed. There was no atrophy of the affected extremities which react well to the induction current. Tendon reflexes were normal. Treatment consisted of baths at 28° R. iodide of potash, inunctions extending over several months and faradisation of the affected limbs in the summer of 1886. He left decidedly better. In the beginning of 1887 he wrote as follows: "I can walk without a stick but I cannot stretch out the fingers of the paralysed hand". For some reason the patient could not follow the treatment in 1887 though strongly advised to do so, but by my advice he had a course of inunctions at home with the result that his last letter was dated from Italy where he had gone on a business journey. He had quite recovered his full activity and his paralytic symptoms had entirely disappeared.

This briefly sketched case is one of many that come here for consultation in which hæmorrhage into the brain—in this case evidently involving the region of the right fissure of Sylvius—had not induced any degenerative changes, that is to say in other words, that suitable treatment was begun in proper time and carried out with the necessary perseverance before any deepseated destructive process had taken root in the brain.

With regard to the diagnosis of the seat of the hæmorrhage it is well that Prevost's rule should be borne in mind. He found that in 91 cases of cerebral apoplexy the eyes in 69 were turned towards the healthy side of the body and consequently towards the side of the brain in which the lesion was, whilst in hæmorrhages into the medulla the patient's eyes were turned towards the side of the affected extremities. These conditions are reversed when the extremities are convulsed. According to my experience this so called conjugate deviation of the eyes occurs chiefly in large,

dangerous hæmorrhages. With regard to the prognosis one should also consider Charcot's valuable rule, that regeneration may be expected if secondary contraction and increase of tendon reflex do not set in during the first fourteen days.

The general features of the disease produced by gummata correspond entirely and completely with those due to other tumours of the brain. These syphilitic neoplasms are situated either in the meninges, the base or the convexity of the brain. In all cases one of the most important initial symptoms is a violent headache with evening exacerbations which frequently robs the sufferer of his night's rest. In my notes of numerous cases of syphilis of the brain I find that this symptom was always present and I have frequently noted it even at the beginning of the infection of the patients of whom I have afterwards heard that they died of cerebral syphilis. Therefore as we have to pay special attention to the initial symptoms, so we should not delay to note as suspicious the occurrence of this violent headache and slight giddiness. If a neuropathic disposition is also present, a point that should be carefully investigated, we must then be doubly watchful. The special local symptoms produced by the tumour are paralysis of the cranial nerves, especially of those of the muscles of the orbit, optic neuritis, weakness of memory, and a condition of melancholia occurring later and, as is well known, changing like the kaleidoscope. If the tumour has its seat in one of the hemispheres—and it has, it appears, a special preference for these—the principal symptom is that condition of cortical irritability which presents the appearances of Jacksonian epilepsy. The experiments on animals already referred to have recently contributed very much to a correct understanding of this condition; and some have gone even so far as to consider every epilepsy as proceeding from the cortex. But since other remote influences play such an important part here it is very difficult to decide this point. It is well known that the convulsions of partial epilepsy follow a regular sequence. If the convulsions begin in the upper limb they pass next to the face and thence to the lower extremity.

If the face is first affected then the arm succeeds and the leg comes next. If the spasms have begun in the leg they extend thence to the arm and to one side of the face. The positions of the so-called motor centres of the cortex have been ascertained for this series of phenomena. The spasms may thus at last become so general that they present the aspect of typical epilepsy. Hemiplegia, but above all monoplegia, is accompanied by these convulsions and besides mental weakness we find disturbances of speech varying from slight stumbling over the syllables to paraphasia and motor and sensory aphasia. The "centres" for the latter disturbances have been discovered by Broca, Wernicke and others in certain portions of the cortex. Naturally the gumma does not always necessarily call forth these symptoms; for example, by breaking down of the gumma an embolus may enter one of the cerebral arteries and may furnish a proximate cause of apoplexy.

But, what is most important, all these symptoms may again disappear, and such a patient may get completely cured. Thousands of cases may be found in the literature of this subject in which the diagnosis between gumma and syphilitic arteritis could not be made with certainty. Moreover not unfrequently both forms are combined.

In the cases quoted above, which are fully described elsewhere by me, various circumstances pointed to the existence of a central disease, but there was nothing more present than a high degree of arteritis.

At present I am attending a gentleman, aged 37 who appears to be completely cured of his syphilitic epilepsy. He contracted syphilis in the year 1875 and the first partial attack of epilepsy occurred in 1879 with spasms in the limbs of the right side. Since then slight attacks have occurred almost yearly and a more severe attack again in 1886. He had antisypilitic treatment under various forms, at one time 48 injections of perchloride of mercury were employed. Last year he suddenly felt a dull feeling in the left side of the back of his head. The tendon reflexes, the eyes as well as sleep and appetite were normal.



The bath and inunction treatment were used, also iodide of potash. The patient has since then remained free from any brain symptoms whatsoever. As the epilepsy occurred quite uncomplicated and as there were no after-symptoms a favourable prognosis could be given from the beginning of the case. In my opinion there was a small syphilitic neoplasm in the cortical substance of the left side.

Some other remarkable cases may not be out of place here. Some years ago Prof. Zuelzer of Berlin sent me a gentleman for treatment who has now been under my care for some years. I saw him first in the year 1879 when he was 28 years old; he had contracted syphilis three and a half years previously and had got rid of his secondary symptoms by means of the inunction cure. Slight aphasic symptoms had occurred rather early. Two years ago he noticed a swelling on his forehead and seven weeks ago several topi appeared on his skull. Zuelzer had already carried out a long course of treatment by means of injections. The patient, who was slightly cachectic, weighed 95 pounds when he came here. His cerebral symptoms were paresis of the facial and hypoglossal nerves of the right side. The treatment consisted of iodide of potash, inunctions and baths.

In 1881 I saw the patient again. During the previous two years there had been much pain in the head. The tongue was paralysed to such an extent that he often bit it. His memory for figures and names was very much impaired. Speech was much interfered with. When he came here, besides these symptoms, there was also a tendency to fall towards the left as well as facial paralysis on the right side. The topi and tendon reflexes were as before. Very thorough treatment was employed. His weight increased to 110 pounds.

In 1885 the patient came for another course of treatment. During the previous four years he had been pretty well. He now weighed 131 pounds. The tongue still inclined a little towards the left and speech was somewhat difficult, the aphasic symptoms were absent. The tendon reflexes were lively, but not exaggerated.

The uvula was straight. The facial paralysis was scarcely noticeable. His memory was better.

He was here again in the summer of 1887. His memory was now quite good. The patient appears flourishing. At the end of the course he was able to stretch his tongue out quite straight. The facial paralysis had disappeared. He was sent away cured his weight being then 134½ pounds.

Perhaps a gumma had existed in this case on the left cerebral hemisphere which had gradually melted away. It was also possible that the tophi or neoplasms resulting from gummatous periostites which pressing on the inner table of the skull were to be regarded as a cause of the headache yet the symptoms were too limited for that and even the pain in the head was not situated in the region of the tophi and moreover was not much increased by pressing on them.

Another case occurred in the practice of my friend Dr. Schwarz of Gotha. The patient, aged 43, came here in the summer of 1882. Dr. Schwarz wrote on him as follows: "He has been ill for about a year and for six months under my care. The disease began with paralysis of the trigeminal and facial nerves, to which was added an ulcer in the ear but this was not directly dependent on the disease. In summer œdema of the optic papilla occurred. The symptoms were at times more marked at others less. The sensorium was affected and every sign of mental disturbance was present. My diagnosis was that there was a tumour in the middle fossa of the skull and Prof. Nothnagel confirmed this opinion. In spite of uncertain anamnesia a trial was made of specific treatment which led to a distinct improvement in his condition so that one could scarcely recognise the patient".

And indeed one could scarcely realise how near this vigorous man had been to death's door. He had contracted syphilis twenty to twenty two years before but had never had any secondary symptoms. His wife had been delivered of a putrid foetus.

A year ago, besides the symptoms already described which

affected the right side, there was violent headache and long continued sleeplessness. Then insensibility to light occurred in the right eye and affected his power of vision. His memory was weak and he suffered from melancholia. His tongue inclined a little towards the right and the right corner of the mouth drooped somewhat. There was paralysis of sensation on the right side of the face. The patellar reflex was good on both sides. There was loss of electric sensibility on the right side. The left pupil was somewhat smaller than the right. He had forty inunctions and fortytwo baths. The paralysis of sensation was decidedly improved.

According to the personal report of his own physician this patient was in the course of time completely cured and all his troubles disappeared. This case shows very well how everything depends on an accurate diagnosis, for this patient evidently owes his life to the timely intervention of his physician: had there already arisen threatening symptoms of pressure on the brain!

The following case is given here more on account of its diagnostic than its therapeutical interest:

In May 1882 a merchant, aged 32, who had lived for five years in childless wedlock consulted me. Twelve years ago he contracted syphilis when glandular swellings occurred in the groin some of which had been operated upon on account of suppuration. The summer before last (1881) he suddenly had headache on the right side of the skull which disappeared after the use of iodide of soda, but which reappeared four or five weeks afterwards. He had a short course of inunctions. There was sleeplessness. There was a strong hereditary taint. This strong powerful man spoke very unwillingly of his troubles. Only the slightly swollen glands on the right side of the neck pointed to the syphilitic condition. He was very awkward in putting on his clothes as there was an almost constant choreic movement of his right arm. He complained of headache on the left side with feelings of depression. After about three weeks it was supposed that there was some

defect in the field of vision on account of a peculiar manner of reading, walking &c. The ophthalmic examination by Dr. Alexander disclosed a very high degree of homonymous lateral hemianopsia of the right side. Double vision with the left eye was present transiently and later there was a brief attack of psychical disturbance with slight hallucinations. Treatment by baths, inunctions and iodide of potash was carried out for a too short time here to attain a definite result as the patient desired to return home. There a further energetic course of iodide of potash was continued. The accounts of this patient, furnished to me by his wife, extend to the close of the year 1883; all symptoms had so far disappeared that the patient thought of carrying on his business again with assistance; according to the description given the hemianopsia appears to have remained stationary but the patient has become so much accustomed to this that he can read quite well.

Different opinions may be held as to the probable site of the syphilitic affection in the above case. In the same year in which I saw this gentleman there appeared a paper by Westphal "On the question of the localisation of brain disease causing unilateral convulsions and hemianopsia" in the sixth annual report of the "Charité-Annalen" in which reference is made to a case very similar to the last. The autopsy showed a deposit in the medullary substance of the occipital lobe. On this occasion Westphal entered into a critical account of the cases of syphilitic deposits where thalamus and tractus opticus were intact which we want to have referred to. Nothnagel believes that if the hemianopsia occurs suddenly in under the form of an apoplectic seizure the ophthalmoscopic condition is negative and if there are no further symptoms the deposit is to be sought for in the occipital lobe. One may therefore in this case conclude with some certainty that there was a deposit in the left occipital lobe even though the motor symptoms of irritation cannot thereby be explained, and one must therefore seek another cause for these in the motor parts or attribute them to a single focus in the thalamus or tractus opticus.



An exact localisation is very difficult if the patients, as has sometimes happened to me, suffer only from severe symptoms of vertigo which occasionally present the characteristics of the so-called Menière's vertigo. One may think therefore of an affection of the semicircular canals, of tumours of the cerebellum, of changes in the medulla oblongata, or of quite general fluctuations of pressure in the interior of the skull. Moreover persons present themselves who, in addition to general brain symptoms, also have symptoms of diabetes mellitus. It is therefore open to every observer to regard the seat of Claude Bernard's *piqûres* as the source of the trouble, but he should remember at the same time that changed conditions of pressure in the interior of the skull, without any direct injury to that region, may produce symptoms of this kind. I have always seen a remission or improvement of these symptoms after the treatment here if they depend on syphilis.

It cannot be surprising that in a great number of persons with syphilis of the brain who come to our baths every year we see often enough that third form which occurs under the aspect of a diffuse chronic inflammation of the brain. The course of this form is pretty well known to be unusually prolonged and very changeable in its symptoms. At one time psychical symptoms are prominent, at another paralyzes, or again convulsions combining with or giving place to each other or occasionally disappearing altogether for a time. This form undoubtedly should be classed amongst the syphilitic psychoses and its great resemblance to dementia paralytica is obvious. The anatomical foundation is not apparent to the naked eye in many cases, perhaps we have to take into account the same chemical poison to which we referred in the beginning of the section on diseases of the spinal cord. In the opinion of Mœbius, Progressive Paralysis is a "Tabes of the Brain". According to Mendel's description and Rieger's apparently extremely careful calculations founded on collections of statistics its connection with syphilis is tolerably certain. The literature of the subject [Erlenmeyer Senior, von

Krafft-Ebing &c.] proves cases of recovery, or of decided improvement as the result of timely treatment.

With regard to the therapeutics of brain diseases I have to draw attention to a few points. It is of some importance in these diseases as in those of the spinal cord not to use too high temperatures; it is quite enough to use baths of from 26 to 27° R. In a great number of these cases I make the patients, especially those affected with violent headache and vertigo, cover the head with cold towels during the bath. I do not order the bath to be longer than half an hour, and frequently allow them only every other day. The douche is used in suitable cases of paralysis with massage and electricity. I entirely abstain from using the vapour baths. Brilliant results are obtained in many cases by combining this method of treatment with iodide of potash and inunctions which must be used freely. The treatment has for its objects to cause the absorption of the tumour, and to re-open the narrowed and obstructed vessels to the circulation and in this way to bring back to a normal state the disturbed conditions of pressure and with the functions of the affected parts. This is a severe task and only to be accomplished when it is undertaken with the greatest energy. Before all it must be in good time. Thanks to the important increase in our knowledge of the localisation of the functions of the brain the task of the physician with regard to the recognition of the disturbances of some of the parts of life's most important organ has been considerably lightened, but since the life, which it is desired to save, is placed in the greatest danger by an improper diagnosis so is all delay and all hesitation to be regarded as prejudicial. But when it should be found to be impossible to elucidate the syphilitic nature of the supposed tumour—what harm does it do to make use of a mode of treatment in order to come to the aid of the diagnosis *ex juvantibus*?—all is at stake, and the lives of not a few patients have been saved by the courageous and timely intervention of their physicians.

Besides the word "timely" we must also lay great stress on "as long as possible". The patient must not hope to be cured

of a disease of this kind by going through a six weeks bath and inunction-cure once. He must come to the baths one year after another and should not be idle at home in the meantime. "One should beware of the superstition that 100 grammes of Grey Ointment, or 100 grammes of iodide of potash can cure brain syphilis" [Erlenmeyer, Junior]. On this all authorities are agreed (Fournier, Charcot, Gerhardt and others) and it is just on this point that physicians are chiefly at fault it may be out of consideration for the position in life of the patients and other hindering circumstances connected therewith or it may be through an exaggerated fear of the consequences of the use of mercury. "Through an unhallowed wish to give a little iodide of potassium by way of experiment many of these patients are deceived, but few cured" (Gerhardt). If one lets slip the right time in useless dallying, if one prolongs the case by timid intervention the fatal words "too late" sound reproachfully and irretrievably. For, if the only too rapid degenerative processes, softening &c. have once taken hold then there is no hope, then the Aachen treatment becomes only an *ultimum refugium*, but unfortunately no longer promises success. Let everyone remember, who is in a position to advise such patients that there are few such severe and dangerous diseases as brain syphilis in which timely and energetic treatment is able to save life. The good results so often recorded will be his reward.



X.

TABES DORSALIS.

BY

G. MAYER, M.D.

GEHEIMER SANITÄTSRAT.







**T**HE first phase of the contradiction of the great discovery made by Fournier and Erb of the connection between tabes and syphilis may be considered as happily overcome. A great number of its earlier opponents have become convinced of the inter dependence of the two diseases; even the sceptical Berlin School, as is shown in the most recent publication by Oppenheim,<sup>1</sup> has gradually inclined to the view which recognises syphilitic infection to be most important preliminary condition for the occurrence of tabes. From the fullest conviction I supported this view at the Biological meeting at Baden-Baden in 1879 and the not inconsiderable number of cases which I have seen since both at the baths and in my own consulting practice have only strengthened me in this opinion. On closer investigation of the previous history of tabes as regards the occurrence of syphilis, at least amongst the more educated classes from whom one may expect somewhat exact information, one receives an affirmative answer in about 90 percent as Rumpf<sup>2</sup> it is certainly correct when he considers it probable that amongst the rest, in spite of their denial, a certain number may still be taken as having been infected formerly with syphilis. I may therefore abstain from giving special statistics with regard to this point because one may easily reply

<sup>1</sup> Berlin. Klin. Wochenschrift. 1888, Nr. 53, S. 1061 ff.

<sup>2</sup> Die Syphilit. Erkrankungen des Nervensystems, Wiesbaden 1887, S. 406.

to me that in my position as bath physician at Aachen I have naturally seen those cases which were connected with syphilis; but I must mention, as in Baden-Baden in 1879, that the proportion given above relates only to those cases which have come under my treatment *not* on account of syphilis or of any previous syphilitic history. But though from the more general acceptance of the connection between the two diseases it is scarcely necessary for me to enter minutely into this matter, I may be permitted to approach the crucial point of the present paper by answering the question: Is a specific treatment of tabes (and especially an anti-syphilitic treatment), found useful in Aachen, and can tabes be thereby cured or essentially improved? It is on this most important practical point that the opposition to the views of Fournier, Erb and their followers is still in full force; for many of those authorities who accept or at any rate no longer dispute the connection between the two diseases will believe nothing of the advantages to be derived from a specific treatment. But in the discussion in the year 1879, already referred to I could even then have shown that improvement had taken place in cases of tabes as the result of specific treatment in Aachen; however, I then stated that the prognosis was by no means so favourable as in specific *myelitis spinalis* which so often occurs in the earlier stages of secondary syphilis and which is accompanied by true paralyses especially of the lower half of the body with increased tendon reflex. As is shown in many cases these symptoms, with the exception of very slight functional disturbances of the bladder and lower limbs, were completely cured by very energetic and long continued courses of inunctions. Moreover the number of those who express themselves in favour of the antisiphilitic treatment of tabes has considerably increased, after Fournier and Erb I may mention my late colleague Reumont<sup>1</sup> also Schulz<sup>2</sup>, Eisenlohr<sup>3</sup>, Landesberg<sup>4</sup>, Voigt<sup>5</sup> of Æyn-

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<sup>1</sup> Syphilis und Tabes Dorsalis, Aachen. 1880.    <sup>2</sup> Deutsch. Archiv f. klin. Med. Bd. 35. S. 473.    <sup>3</sup> Deutsch. Med. Woch. 1884. Nr. 54.    <sup>4</sup> Berl. Klin. Woch. 1885. S. 529.    <sup>5</sup> Berl. Klin. Woch. 1885. S. 31.

hausen, Berger<sup>1</sup> and above all Rumpf<sup>2</sup> who produced such extraordinary favourable effects by his treatment by means of inunctions with the simultaneous use of the faradaic brush that all the results previously attained were quite surpassed. On the other hand Leyden and many of his pupils have taken quite an opposite stand point with regard to this question. Naunyn has also spoken very unfavourably of the treatment of syphilitic tabes by inunctions in his highly interesting work on the prognosis and treatment of the syphilitic diseases of the nervous system<sup>3</sup> in which he says: "the prognosis of developed tabes dorsalis paralytica and of dementia paralytica, according to my experience, is quite independent of the question whether syphilis is, or is not concerned therein and in both the treatment by means of mercury is without effect". In incipient tabes Naunyn admits the possibility of a favourable influence as the result of such treatment.

Oppenheim<sup>4</sup> on the strength of a single case of pseudotabes syphilitica (which presented very similar series of symptoms to those of tabes, but which pathologically corresponded essentially with a case of syphilis of the spinal cord described by Jürgens<sup>5</sup>) will permit the use of specific treatment only in those cases which can scarcely be recognised during life.

It will now be my task to contribute to the solution of this question from my own statistics; but I must first mention some recent literature which furnishes further facts to explain the connection between tabes and syphilis.—From the pathologico-anatomical stand point it is objected to this connection that syphilis excites no systemic disease; however, these new authorities are well suited to set aside this objection.

According to Adamkiewicz<sup>6</sup> there proceed from the vessels

<sup>1</sup> Deutsch. Med. Woch. 1885. S. 21.

<sup>2</sup> Die Syphilitischen Erkrankungen des Nervensystems. Wiesbaden 1887. S. 431 ff.

<sup>3</sup> Mittheil. aus der med. Klinik zu Königsberg, Leipzig 1888. S. 4 ff.

<sup>4</sup> Loc. cit.

<sup>5</sup> Charité Annalen 1880.

<sup>6</sup> Die degenerativen Krankheiten des Rückenmarkes. Stuttgart 1888. S. 106.



interstitial proliferations which destroy the nerves of the posterior columns and this is the first, the primary nerve degeneration which beginning in certain portions of Burdach's column ends in changes in the neuroglia thus forming the second characteristic of the process underlying tabes. Further on he says<sup>1</sup>: "according to the results attained by saffron staining the (parenchymatous) changes peculiar to tabes in Burdach's column in spite of their columnar arrangement have no relation to any system (of nerve fibres)". Rumpf<sup>2</sup> according to his investigation of a rather recent case is in a position to state definitely that the starting point of the disease is in the blood vessels at least in this case. Krauss likewise found in Berger's patients almost always a thickening of the vessels which in two cases was complicated with aortic incompetency.

Rumpf also points out that many changes in the funiculus posterior are to be regarded as secondary degenerations if the gray edge of the posterior columns (Strümpell) is considered to be the primary seat of the disease.—The question of the secondary nature of the tabetic degeneration, which appears from clinical evidence to be of sufficiently frequent occurrence, has entered upon a new phase on account of a most interesting communication by Jendrassik<sup>3</sup>. Jendrassik made a very minute pathological examination of two cases of tabes, but before he published these he endeavoured to prove on physiological grounds that the peculiar alterations of sensation in tabetic patients must be of a cerebral nature (occasioned according to Bolko Stern by a derangement of judgement) and depend on a disturbance of the associating faculty of the cerebral cortex. But the motor disturbances, the want of coordination according to some others cannot depend on the spinal cord as the coordinating function is not present therein (Erb, and others). Jendrassik accordingly places the coordinating centre in the cortex by which alone we are conscious of the

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<sup>1</sup> Ibid. S. 129.

<sup>2</sup> Loc. cit. S. 415.

<sup>3</sup> Deutsches Archiv für Klin. Med. 43. Bd. 6. Hft. S. 543.

external world and through which we are able to influence the individual parts of our bodies. From this it would naturally follow that ataxia (loss of coordination) can only arise through a lesion of the cortex.

Jendrassik brings forward a number of cases in which the posterior columns were very much degenerated without ataxia, and others in which ataxia occurred without degeneration of the posterior columns. In the first category there was amongst others a case reported by Schulz<sup>1</sup> and one by Babinski<sup>2</sup>; in the second category there was one by Strümpell and especially one by Bennett<sup>3</sup> and another communicated by Planton and Lewis<sup>4</sup> in which the spinal cord was found quite normal or very nearly so.

The atrophy of the optic nerve, paralysis of the muscles of the eye and the deafness so often present may also be not of spinal origin; on the other hand a cerebral origin of the disease, such as a lesion of the cortex does explain these symptoms.

Jendrassik in his two most carefully observed cases found a more or less marked degeneration of the posterior columns accompanied by quite similar changes in the cerebral cortex, first as Tucek found in general paralysis, only that in the latter the anterior portions of the cortex were more affected whilst in both of the cases of tabes the lower and posterior convolutions were attacked. These changes affected the tangential more than the radiating fibres. Moreover, granular cells were also found together with globules of myeline. — Jendrassik considers it very probable that after such a lesion of the cortex secondary degeneration may take place extending down to the posterior columns. He accordingly ascribes the greater number of tabetic symptoms to the cortical lesion and considers principal (primary) tabes dorsalis identical with dementia paralytica though with a different local-

<sup>1</sup> Archiv für Psychiatrie. Bd. 12. S. 232.

<sup>2</sup> Progrès Medical 1887, Nr. 23.

<sup>3</sup> A case of locomotor ataxia without disease of the posterior columns of the spinal cord. Brit. M. J. 1885, Mch. 7.

<sup>4</sup> Virchow-Hirsch Jahresbericht 1878. Bd. II, S. 115.

isation. At any rate our own experience, as well as the results of clinical observation show a not unfrequent connection between these diseases.<sup>1</sup> Jendrassik concludes his very interesting article with the following *résumé*: "Putting together the foregoing facts it appears that in the cases of two patients who died of purely characteristic tabes dorsalis I have succeeded in demonstrating to proof the peculiar change in certain parts of the brain; as regards localisation, according to our present experience, this change though histologically indentical with that occurring in dementia paralytica appears to have a different seat. The recognition of this change together with the conclusions drawn from the symptoms of tabes makes it very probable that the greater number of the tabetic symptoms proceed from disease of the cortex and that tabes dorsalis is not a disease of the spinal cord but of the brain. From the facts recorded in the literature of this subject it is probable that the sclerosis of the posterior columns is a secondary degeneration corresponding to these changes".

We have given somewhat in detail the results of various researches by eminent investigators without attempting to decide in favour of any of them although the opinion of Jendrassik appears to us very attractive because our clinical experience teaches that tabes is preceded very often by brain symptoms or else begins with or is combined with them. At any rate Jendrassik's article shows how little one is justified, according to the present standpoint of investigation, in separating tabes from syphilis merely on the ground that in the opinion of some physicians it is not related to it pathologically.<sup>2</sup>

Moreover Virchow<sup>3</sup> describes a case of syphilitic tabes and says distinctly that many cases of tabes dorsalis are undoubtedly syphilitic and he mentions this affection amongst the syphilitic

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<sup>1</sup> See also Fournier, *L'Ataxie locomotrice d'origine syphilitique*. Paris 1872, pp. 270 and 375.

<sup>2</sup> See also Gowers "On syphilis and the Nervous System". The Lancet. Feb. 12. 1889, p. 64.

<sup>3</sup> "Die krankhaften Geschwülste". Berlin 1864-65. II. Bd. S. 428-461.

diseases of the spinal cord. Also the authors of the two new German handbooks of special pathology and therapeutics most in use, Strümpell and Eichhorst have more or less approached the views expressed by Fournier and Erb on the ætiology as well as on the therapeutics of tabes.

As regards my own experience, I must repeat that in nearly every case of this disease a sufficiently searching examination of the patients showed that they had previously been syphilitic.

From the year 1879 (the date of my first report at Baden-Baden) to the end of 1887, being nine years, I have attended in my practice at the bath 73 cases of undoubted tabes. I have excluded from this number every case about which there was any doubt, especially some which according to more recent views are to be classed with polyneuritis. I have also excluded those cases which came first for treatment in the year 1888. Of these 73 patients, who were all men, only 2 denied having suffered from syphilis or at any rate from chancre. I saw a tabetic woman in 1888 who had been infected with syphilis by her husband 25 years previously. As far as I can gather from my notes, I saw during the same time in my public and consulting practice 18 other cases of tabes, of these there was only one patient, whom I attended for a very long time until his death, who never admitted having suffered from syphilis. All the others had the disease. On the whole I remember having seen only 4 tabetic women. The striking disparity between the sexes, which is certainly greater than the percentage relation between them as regards syphilis shows that there are still other reasons for the great preponderance of cases amongst the male sex. Now in local affections resulting from syphilis there is still some reason why in one case one organ and in another another should be attacked. Concerning this Virchow says<sup>1</sup>: "It appears to me as if the choice of a site for a local deposit of syphilis depended essentially on

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<sup>1</sup> Ueber die Natur der constitutionell-syphilitischen Affektionen. Berlin 1859. S. 40.



accidental derangements which affect various parts of the body during the period of infection".

It is evident that tabes may be produced occasionally by other causes, amongst these are fatiguing marches, catching cold, especially in the lower extremities, and perhaps also excess *in venere*. My experience convinces me that injuries of the lower limbs also have some influence. It has always seemed more probable to me that the entire mode of life has an influence on the occurrence of syphilitic relapses and the later forms of the disease and I advise every one who has had a course of anti-syphilitic treatment to lead as regular a life as possible for a long time, still better—ever after, and to avoid errors in diet, especially intemperance as regards spirits, catching cold and great excitement. It is certain that, no matter how energetic the treatment may have been, the poison whether it be of a bacillary nature, as seems likely, or not, cannot be completely eradicated. Whilst by a quiet, regular, even course of life complete health is gradually restored through the action of the tissue changes, or at any rate the activity of the poison becomes so much reduced that it no longer produces any important local manifestations, on the other hand persistence in the evil courses above mentioned which lead to so many congestive conditions, may easily create a new focus for a local affection. If, when discussing the syphilitic origin of general paralysis Mendel says<sup>1</sup> "a dormant syphilitic disposition of the brain is frequently first awakened by some other evil influence acting upon it", *mutatis mutandis*, the same may be said of all late manifestations of syphilis and the only rational therapeutics of syphilis during life is therefore a repeated and energetic mercurial treatment and as strict a rule of life as possible both during the course and afterwards. Unfortunately the latter condition is often far more difficult to fulfil than the former.

We will now try to give from our own personal experience some contribution to the prognosis in tabes under antisyphilitic

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<sup>1</sup> Die progressive Paralyse der Irren. Berlin 1880. S. 250.

treatment; we consider ourselves all the more justified in doing so since Naunyn on principle excluded tabes from his extensive compilation on the prognosis in syphilitic diseases of the nervous system. It is true we are unable to bring forward such favourable statistics as in the case of certain manifestations of the earlier period, such as syphilitic epilepsy, syphilitic apoplexy, myelitis &c. in which with suitable treatment the prognosis is comparatively favourable and in which the cure is more complete than in the case of tabes which frequently comes under treatment only when serious defects have shown themselves. Of the 73 cases occurring between 1879 and 1887 we have already stated that syphilitic infection was not admitted in two cases, I am therefore unable to include these in my tables. There remain therefore 71 cases.

I. The general prognosis of tabes with antisymphilitic treatment (without any selection of cases, that is to say, as regards all cases without distinction as to the severity, duration &c.) is set out in the following table:

|                                        |              |
|----------------------------------------|--------------|
| 1) Result unknown                      | in 14 cases, |
| 2) no improvement                      | » 22 »       |
| 3) improvement                         | » 11 »       |
| 4) very great improvement              | » 19 »       |
| 5) nearly cured                        | » 4 »        |
| 6) subsequent considerable improvement | 1 case.      |

It would be correct to add the cases in which the result was unknown to those in which there was no improvement; there was therefore in nearly half the cases (35) a good result, in 19 cases a remarkable improvement and in 4 almost a cure. I cannot record an absolute cure for some slight defect remained in all though frequently so trivial as not to inconvenience the patient.

II. We will now classify the patients according to the time which elapsed between the date of infection and the first occurrence of tabes. We have accordingly the following results: [In very many perhaps in most cases the symptoms no doubt appeared earlier, but without attracting the notice of the patient or his physician.]

The first symptoms of tabes were remarked after the date of infection:

|              |            |                                                                                          |
|--------------|------------|------------------------------------------------------------------------------------------|
| 1 to 5 years | 3 patients | (of whom 2 were improved, 1 no result),                                                  |
| 5 " 10 "     | 18 "       | (of whom 2 improved, 8 very much improved, 1 almost cured, 4 unknown, 3 without result), |
| 10 " 15 "    | 25 "       | (2 improved, 5 very much improved, 2 almost cured, 5 unknown, 11 not cured),             |
| 15 " 20 "    | 11 "       | (4 improved, 3 very much improved, 1 unknown, 3 no result),                              |
| 20 " 25 "    | 9 "        | (2 improved, 1 very much improved, 1 nearly cured, 2 unknown, 3 not improved),           |
| 25 " 30 "    | 3 "        | (1 very much improved, 1 unknown, 1 not benefited).                                      |

(In two of the cases accurate dates could not be ascertained.)

It therefore appears that though the prognosis is somewhat more favourable when tabes occurs early than later yet the difference is not so striking, it may, however, appear more distinctly with a greater number of cases. Still it may be seen clearly from our tables that even where tabes has occurred at a very late period the results of specific treatment cannot be denied.

III. We have endeavoured to form some statistics with regard to the energy with which the antisyphilitic treatment is carried out. For this purpose we employ the histories of the 71 patients who have performed the "cure" here 118 times. We will make some observations later on on the average duration of the "cure", but at the present moment we shall consider only the total number of courses of treatment.

45 patients had each 1 course, of these:

13 unknown, 18 no result, 7 improved, 6 much improved, 1 almost cured.

There were therefore 14 cases in which the treatment was effective against 31 without result.

14 patients had each 2 courses of these:

5 no result, 2 improved, 7 much improved.

There were accordingly 9 results against 5 without result; in one case the improvement was only transient as brain symptoms showed themselves after a time. (The proportion should therefore be 8 : 6.)

7 patients had each 3 courses, of these:

1 no result, 3 improved, 2 much improved, 1 almost cured.

There were therefore 6 improved against 1 without result; in one case in which the tabetic symptoms were much improved the patient afterwards developed general paralysis so that the proportion should be 5 : 2.

2 patients had each 4 courses, of these:

1 much improved, 1 almost cured.

2 patients had each 5 courses, of these:

1 much improved, the other almost cured.

1 patient had 6 courses.

In this case moderate improvement was attained.

It is therefore evident that the prognosis depends essentially on the perseverance with which the antisyphilitic treatment is carried out. It should also be remembered that those especially who found benefit from the first course decided to repeat it, also that it was chiefly in such favourable cases that repeated courses were employed.

There is, however, not the slightest doubt that repeated and energetic courses of antisyphilitic treatment are necessary for the successful treatment of tabes. It is probably in this (apart from faradic treatment), that the secret lies of the good results attained in the cases of Rumpf compared with those of Naunyn. As far as one can judge from Naunyn's writings in tabetic cases he employed courses of 30 or 40 inunctions each of from 2 to 3 and later from 4 to 5 grammes. Naunyn does not speak of the repetition of the courses except in one case in which continued improvement took place. On the other hand Rumpf<sup>1</sup> extends antisyphilitic

<sup>1</sup> Loc. cit. S. 451 u. 596.



treatment over at least a year or eighteen months. I have referred to those patients who were visitors of our baths; the course in most cases consisted of from 40 to 60 inunctions, though occasionally the number was increased to 100 (as I will describe later in connection with the therapeutics) and this course was repeated the following year or later. It appears clear to me, especially from the foregoing statistics, that my results are considerably more favourable than those of Naunyn, but somewhat less so than those of Rumpf who was in a position to treat a greater number of his patients for a longer time and more uninterruptedly than is possible in a bath practice.

IV. Prognosis according to the simultaneous presence of other syphilitic symptoms.

Amongst the 71 cases already referred to syphilitic symptoms were still present in 14 patients. This contradicts the view so often expressed: that the simultaneous occurrence of syphilitic symptoms is rare in tabes, at the same time this proportion may be too high as an average, because a great number of such cases which still show distinct signs of syphilis are sent to Aachen.

The following were the complications together with the results of treatment:

- 1) Tabes with tophi on the skull: much improved.
- 2)   "       "   Periostitis tibiæ: much improved.
- 3)   "       "   disease of nasal mucous membrane: almost cured.
- 4)   "       "   recent perforation of the hard palate: much improved.
- 5)   "       "   psoriasis palmaris: no result.
- 6)   "       "   psoriasis univers. syphilit.: much improved.
- 7)   "       "   mucous patches in mouth: much improved.
- 8)   "       "   mucous patches and tophi: much improved.
- 9)   "       "   Rupia specifica: much improved.
- 10)  "       "   Rupia with lung disease: almost cured.
- 11)  "       "   Mucous patches in scrotum: improved.
- 12)  "       "   Papules on arm & leg: much improved.

- 13) Tabes with mucous patches on tongue, pustules on scalp: improved.
- 14) » » papular syphilides: result unknown.

There are therefore here only two cases out of 14 without result; they contain the half of the entire number of the almost cured and most of the patients were greatly benefited. It is also evident that the simultaneous presence of syphilitic symptoms is a very favourable sign as regards prognosis. Reumont also found this to be so.<sup>1</sup>

I have already mentioned that in a case which presented all the appearances of tabes and which was distinctly improved by inunctions, but in which other symptoms of disease of the central nervous system appeared, Oppenheim found *post mortem* the appearances of ordinary syphilis of the spinal cord (Pacchymeningitis interna chronica, arachnitis spinalis gummosa, cellular granulation tissue in the transverse section of the spinal cord, endarteritis and periarteritis), but on the other hand the posterior columns were only slightly affected. This case caused Oppenheim to think that, if in a disease simulating tabes anti-syphilitic treatment had a distinct effect it was permissible to infer that it was not a case of true tabes but was a pseudo-tabes syphilitica. But perhaps this case also showed that antisiphilitic treatment almost cured an incipient tabes though it was unable to prevent the occurrence of other specific affections of the spinal cord. To the practical physician there is only one form of tabes, which is very variable in its individual symptoms, but these, on the whole, present so characteristic a picture that every skilled practitioner may recognise it. In all cases of this kind if the strength of the patient permits it specific treatment is indicated if the previous occurrence of syphilis can be proved, perhaps even when this cannot be established. According to our experience and that of others there is greater hope of a result being obtained if some external signs of syphilis are still present.

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<sup>1</sup> Loc. cit. S. 36. u 53.

V. I have abstained from giving a special prognosis according to the duration of the disease because the statements of patients as to commencement were so unreliable. At the same time it is evident that mild cases and those which come early for treatment generally afford a better prognosis with specific treatment than severe cases and those of longer duration.

VI. Amongst these 71 cases I have noticed affections of the eye 35 times, that is in almost half the entire number. The result of anti-syphilitic treatment as regards the symptoms of tabes were as follows:

- 1) Tabes with Myosis 10 cases; 2 result unknown, 1 no result, 4 improved, 1 much improved, 2 almost cured.
- 2) Mydriasis (chiefly unilateral) 10 cases; 2 unknown, 3 no result, 2 improved, 3 much improved.
- 3) Paralysis of external ocular muscles 9 cases; 1 result unknown, 4 no result, 1 improved, 1 much improved, 2 almost cured.
- 4) Atrophy of optic Nerve 6 cases; 3 unknown, 1 no result, 2 improved.

According to this very imperfect table to which I attach no great importance, the percentage of improvement in tabes is not much altered by the presence of affections of the eye. Relatively, the best results took place in the cases complicated with Myosis.

VII. There were 16 cases in which tabes was complicated with various cerebral disturbances.

- 1) Tabes with general paralysis 6 cases; in 5 treatment had no result, 1 much improved.
- 2)   "       "    vertigo and vomiting 4 cases; 1 no result, 2 much improved, 1 almost cured.
- 3)   "       "    previous apoplexy and impairment of speech; 2 cases, 1 improved, 1 much improved.
- 4)   "       "    deafness, 1 case; no result.
- 5)   "       "    epileptic attacks, 1 case; much improved.
- 6)   "       "    loss of memory, 1 case; no result.

It is therefore evident that general paralysis is a very unfavourable complication of tabes, though far less so as regards

other symptoms of cerebral syphilis. Moreover, on the occurrence of dementia paralytica the symptoms of tabes frequently subside. In Aachen we have few opportunities for prolonged observation of such cases since for the most part they must be sent soon to a lunatic asylum. Alienists, however, are frequently opponents of energetic mercurial treatment in these cases. On the other hand Mendel<sup>1</sup>, one of the best writers on these diseases, recommends antisyphilitic treatment in suitable cases. In most cases of mental disease it is naturally difficult to carry out inunctions or similar mercurial treatment, the important care of the mouth, the regular supplies of fresh air which are not always obtainable and irregularities in the nourishment of the patient render the treatment extremely difficult. At the same time, though I do not venture to give a definite opinion on general paralysis as a complication of tabes, yet I am inclined to think that even where this sad effect of syphilis is present a somewhat satisfactory result may be obtained; the persistent mental defect is naturally much more grave than is the bodily trouble in tabes.

With this statement of the prognosis in tabes we gave a general description of the antisyphilitic treatment of tabes in Aachen; it remains, however, to give a short account of the rules to be observed with these measures, as well as some cases of patients by way of illustration. The methods employed in our mercurial treatment and the mode in which it is combined with the baths as well as the views of the majority of Aachen physicians thereon, have all been described in a preceding section of this book. In the treatment of tabes a mercurial inunction will be given on an average every day a short time after the bath; I often begin with from 3 to 4 grammes of Ungt. Ciner. and afterwards increase the dose if it is well borne to 5 or even 6 grammes.

The number of inunctions for an efficient course must be at least 40 to 50. In many cases this limit has been far exceeded

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<sup>1</sup> Loc. cit. S. 290.



and even doubled with the best results. If not well borne, and especially when the course is being repeated, not more than 30 to 40 inunctions should be employed. In the treatment of tabes one not unfrequently observes that at the beginning of the inunction cure the symptoms get worse and this may continue during the whole course and even for a certain time after, but often gives place to a marked improvement later on. In other cases, especially in very robust persons, a very decided improvement sets in during the course. As a rule the inunctions are made, as already mentioned, with Ungt. Hydrarg. Ciner.; if the skin is hyperæsthetic in some places these must be passed over; in many cases, especially where there is great fatigue of the legs, mercurial soap, which is easier to rub in, should be used.—Simple sulphur baths of about 20 minutes duration and  $27^{\circ}$  R. (frequently even of  $26^{\circ}$  R.), are usually given. Cooler baths are scarcely tolerated here, sometimes a bath here of  $27^{\circ}$  R. does not appear to the bather to be warmer than a Carbonic acid bath of  $25$ — $26^{\circ}$  R.; many patients found  $27^{\circ}$  still too cool and had to have it at  $28^{\circ}$ . The quantity of the thermal water drunk should not be too great: 750 grammes daily will always be sufficient. The douche should be employed only in very rare cases and only with very powerful constitutions alternating with simple baths; most tabetic patients are unable to tolerate the douche.—Exercise should be permitted only in proportion to the strength of the patient; at the same time every mercurial treatment is favoured by the patient being as much as possible in the open air and this, when necessary, can be accomplished with the help of a bath-chair.

From the remarks on prognosis it will be seen how necessary a repetition of the course is to procure a favourable result and in this we are also supported by the histories of the patients.

Electricity is the most powerful adjunct to the bath and mercurial treatment of this disease, the galvanic method according to Erb<sup>1</sup> or the faradic brush of Rumpf may be chosen, or both

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<sup>1</sup> Handbuch der Electrotherapie. Leipzig, 1882. S. 380.

methods may be combined. I may, however, mention here, that although in very many cases, especially in repeated "cures", simultaneous electric treatment is employed, yet of the 4 patients whom I have described as almost cured two had been treated without electricity so that in these the good result can be ascribed only to the antisyphilitic treatment.

Iodide of potash (or iodide of sodium) plays an important part in the treatment of tabes as in all syphilitic diseases of the nervous system, yet I cannot attach so much importance to its use here as in many cases of syphilis of the brain in which large doses of iodide often produce very striking results. It may, however, be of great benefit to the patient if given either at the same time as the mercurial inunctions, or during the intervening months in doses up to 30, 45 or even 75 grains per day.

In the winter following a course here, I give the patient nitrate of silver up to 1 grain daily in pills for three months; I have seen undoubted good results from this treatment as regards the lancinating pains. Ergotin, which is specially recommended by Althaus,<sup>1</sup> I have not employed; it is well known that Tuzcek found that tabetic symptoms occur—readily after poisoning with Ergotin. I have used strychnine only subcutaneously as a local remedy in paralysis of the bladder.

In connection with the treatment of tabes two other German watering places, Nauheim and Eynhausen deserve special consideration. These carbonic acid brine baths appear to exert a specially favourable influence on this disease and may be ordered as a subsequent measure of treatment to the specific courses at Aachen.

Since Rumpf<sup>2</sup> ascribed the undoubted results of his combined antisyphilitic and faradic treatment partly to the more lasting stimulation of the skin produced by the latter, whereby a transference of the sensory stimulation to the motor and trophic centres

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<sup>1</sup> Ueber Sclerose des Rückenmarks. Leipzig 1884, S. 184.

<sup>2</sup> Loc. cit. S. 465.

and a more thorough circulation and nourishment of the central nervous system was produced, one may attribute a similar influence to the bath-cures of Nauheim and Eynhausen. On the other hand, both these baths on account of this stimulating action on the skin are far less suited for the simultaneous employment of the inunction cure than those of Aachen and this has been often enough recognised both by physicians and patients. In April 1888, when sending me a patient to undergo the inunction treatment at Aachen before the treatment at Eynhausen was begun Dr. S. Cohn wrote "I have certainly seen in recent years very excellent results when Aachen and Eynhausen supplemented each other in the case of such patients".

I have seen less benefit from the cold-water-cure establishments than from these baths in cases of tabes.

To illustrate the foregoing remarks, I will now, in conclusion, give a few cases in which our treatment produced specially excellent results.

1) von L. from Russia 14. Aug. 1879 aged about 36 years, sent here by Dr. Erb. Infected 10 years previously, married 2 years, no children. For the past year has had marked lancinating pains, difficult micturition, double vision, lassitude. Patellar reflexes completely absent, distinct analgesia in both legs, stands very badly with closed eyes; he had also cerebral symptoms, attacks of disturbance of speech and vertigo, alternating hemi-paræsthesia, alternate dilatation of pupils.

After 50 inunctions there was marked diminution of the pains, later he was treated by electricity by Erb and then took iodide of potash for two months. In the following year he took the Koumiss Cure in South-Russia.

14. June 1881. He stands and walks better with closed eyes. Left pupil dilated. Micturition still difficult. Vertigo still frequent. Had a course of twenty inunctions.

14. March 1884. Condition greatly improved, very little vertigo now. Hemiparæsthesia no longer occurs. Lightning pains only after great efforts. Pupils equally dilated, react well. Can

walk easily for hours. Very slight, scarcely perceptible ataxia. Bladder acts fairly well. Sexual functions normal. Had a course of thirty inunctions.

10. Nov. 1886. On account of a slight catarrh of the bladder the patient went through a "cure" at Wildungen. General condition very good. Lancinating pains very seldom now. No more analgesia, or anæsthesia. Micturition without any special difficulty, no enuresis. Pupils equal and react well. Gait very good, scarcely perceptible ataxia. No patellar reflex.

2) G. R. aged 40. German merchant. 21. June 1883. In 1863 he had a chancre with buboes. He remarked little more after that. In 1872 got married. Since 1874 lancinating pains. 1876 apoplexy with paralysis of right side and aphasia; improvement after an inunction cure. 1882 ulceration in mouth; May 1883 lupoid eruption on left cheek, on the right side of forehead and temple. At the same period there was a soft painful tophus of the ulna of the right arm. No double vision. Patellar reflex completely absent. A high degree of ataxia, cannot stand with closed eyes. Very uncertain, bent gait. Right arm and leg still somewhat weaker. Micturition pretty good, defæcation difficult. Impotence. Myosis on both sides. Former weight 148 lbs. now 126.

After a course of 40 inunctions all outward symptoms completely disappeared and the periostosis became quite painless. Gait distinctly better.

1884, 5. May. During the winter he had only very slight lancinating pains. Gait pretty good, stands far better with closed eyes. Still some lassitude. No patellar reflex. Weight 135. Had thirty inunctions. After these considerable improvement. Weight 139. Gait very good. He can, now once more attend to his business.

3) Count M., Belgian, aged 49 years. 22. Aug. 1884.

Contracted syphilis 25 years ago; married 20 years, eight healthy children. Has had for a long time violent lancinating pains. great lassitude, uncertain gait, marked ataxia. Walks and stands



badly with closed eyes. On the right side of the spine there is a very characteristic pustulo-macular eruption occupying a space of more than a hand's breath. Dulness in front on the left side from above down to the fourth rib with indistinct breath sounds; at the back dulness extending somewhat less downwards on the left side with bronchial breathing. Shortness of breath, cough and expectoration of slimy masses (*Lungsyphilis?*), pulse 108, temperature not essentially raised.

A course of fifty inunctions which was carried out with one intermission of ten days, worked magic. The syphilitic eruption disappeared. The dulness on percussion perceptibly diminished. On the 19th Oct. the patient informed me that for the previous six or seven weeks he had no longer any pains. Gait quite easy, very little lassitude. Patellar reflex on the left, distinct, though weak, on the right only traces. Standing and walking with eyes shut fairly good; has increased over ten pounds in weight. He was now ordered to take iodide of potash for three months. As he had to take up a diplomatic appointment out of Europe he was obliged to make a journey in the country before leaving and in this way brought on a severe attack of bronchitis in November. Before he had quite recovered from this caught fresh cold and, as it appears, was attacked by catarrhal pneumonia in Liege and succumbed in a few days. His widow informed me on 1<sup>st</sup> January that after the "cure" here he had found himself quite well until the occurrence of this accidental illness.

4) Herr R. from German Russia, aged 32 years. 22 April 1887. Sent by Prof. von Wahl. Infected in 1880. Had a course of inunctions in this and the following year; has had lancinating pains for two years.

Very frequent violent stabbing pains in the thighs, feeling of numbness in the left side. No double vision. Micturition difficult. Tendency to constipation. Very unsteady gait with closed eyes; ataxia well marked during complicated movements; complete absence of patellar reflexes. Pupils mobile, normal. Frequent palpitation and sense of numbness in the finger points.

Patient married eighteen months ago. Wife died in child bed. Child aged six months, healthy.

Bath cure with fifty inunctions. After that his gait and power of standing with closed eyes distinctly better. Pains very slight. Sense of numbness in left hand disappeared.

15. Aug. 1888. Patient took nitrate of silver for three months during the winter besides cold sponging and galvanism. The improvement made still further progress, pains only very seldom and not severe.

Stands and walks much more steadily, very slight ataxia. No patellar reflexes.

Micturition better. Sexual powers improved. Had forty inunctions. — At the end of this course he had increased 4 lbs. in weight (from 137 to 133). Gait very good and is also better with closed eyes. Pains now only very slight. General condition excellent.

On the 1<sup>st</sup> March 1889 patient came back for a third course. Except the absence of the patellar reflexes had he no symptoms of his disease. Only after vigorous movement he had sometimes slight darting pains. Patient had ridden and danced a good deal during the winter. Weight 142 lbs.

5) G., aged 58, from the Rhine province.

Thirty six years ago had syphilitic ulcer. Treated by Zittmann's cure. Married twenty five years ago; three healthy children. For some years has had violent lancinating pains in the leg, is easily fatigued by walking, weakness on going upstairs. Can still walk for about an hour, though with difficulty. Very unsteady with closed eyes. Sensibility and perception of pain diminished in the legs. Micturition difficult, at times enuresis.

Last year he had double vision for six weeks. At present there is marked immobility of the pupils. Had 40 baths at 27° R. of 20 minutes each together with inunctions each of 4 to 5 grammes. A good result at once followed, disappearance of the pains, which were formerly so violent, as well as of sense of fatigue. During the winter he took nitrate of silver for three months.

Commenced a second course on 10<sup>th</sup> July 1888. His general condition had still further improved. Patient can walk for several hours, during the winter he has gone into society, even danced, &c. He had 40 inunctions. On Sept. 10<sup>th</sup> 1888 his general condition was very good only that micturition is somewhat difficult.

I saw this patient again on 5<sup>th</sup> Feb. 1889. He had made a fatiguing business journey and still found himself remarkably well; after he had been moving about on business all day he used frequently go to the theatre in the evening. Patient walks without a stick, no longer feels any special fatigue; during the whole winter he has had slight lancinating pains only twice. Micturition still slow, very seldom indeed a few drops pass involuntarily. He still stands and walks somewhat unsteadily with closed eyes. He is greatly pleased with the very remarkable improvement attained by two courses and will go through a third course next summer.

I must content myself with relating these few cases from my own practice and I might add many similar ones, but I think it proper to mention here the histories of two cases which have been supplied to me for publication by my colleague Dr. Brandis in the most friendly manner.

6) Captain L. aged 44, English. Came under treatment 1 Mch. 1887. Infected in 1867; secondary symptoms brief course of treatment.

The first symptoms of tabes appeared eight months ago in the form of lancinating pains in the legs; later on double vision through paralysis of the left abducens (*Strabismus convergens*) in addition to this weakness of the bladder which rendered the catheter necessary. No patellar reflexes. These symptoms grew rapidly worse. Patient has been under treatment here since with an interruption of six months. After the first course of six weeks the pains diminished and occurred only now and then as slight reminders. He had on the whole—with suitable pauses—151 inunctions of 2.5 grammes larger doses having caused stomatitis. Patient weighs from 113 to 116 lbs.

Condition on 28 June 1889: very slight double vision if a

light is held on the left side, he has no longer any strabismus. Gait very good. Pains only very seldom. Urine clear, acid; catheter still used once in twenty four hours as a measure of precaution. A trace of patellar reflex. There was therefore constant progressive improvement during two years.

7) Major L. English, aged 37 years.

Infected in 1876; iritis on left side; remained well until March 1888. Then weakness of sight occurred and soon after a feeling of numbness in the legs with spasms. On beginning treatment here on the 10<sup>th</sup> August 1888 there was commencing atrophy of the optic nerve, diminished power of sight and colour-blindness. No patellar reflex. Ataxy. Uncertain gait with closed eyes. Up to Oct. 20 he had fifty-six inunctions with an interruption of ten days on account of Stomatitis and diarrhoea. At the end of the course the eyes were completely re-established. At the beginning of the second course on 10. Dec. 1888 the eyes were well. Patellar reflex distinctly present on the left, but doubtful on the right side. On 21 Jan. 1889 no longer any spasms, ataxy distinctly less, can stand twice as long on one leg as before. Weight increased 15 lbs. since 10 Aug. (from 136 to 151).

### CONCLUDING REMARKS.

Our entire experience urges us to give a place to tabes amongst those diseases which must be attacked by energetic mercurial treatment. Although the outlook is certainly better when the disease is in its first stage and the time elapsed since infection is not too long and especially if syphilitic symptoms are still present, if the strength of the patient allows it one should not fail to at least try such a course even in advanced cases in which the period of infection is very remote (such as cases 5 and 6). Moreover, it is indeed possible, as the above quoted case of Oppenheim as well as that recently communicated by Eisenlohr to the Medical Society of Hamburg<sup>1</sup> show, that the clinical symp-

<sup>1</sup> Deutsche med. Wochenschrift 1889, No. 6, S. 115.



toms of tabes, or at any rate symptoms which are strikingly like them appear in cases which yield *post mortem* evidence of specific spinal meningitis, gummatous formations &c. as well as disease of the posterior columns.

It is certainly very difficult to discriminate between these during life, but the possibility of the presence of such changes in the spinal cord should determine us all the more to use energetic specific treatment, the "inunction cure" being the best form. This should be by no means of short duration and must be repeated without too long intervals. In this way an arrest, frequently a subsidence of the symptoms and in a few cases almost a complete cure may be attained.

As already stated other suitable means are not to be set aside. In those cases in which the specific treatment is unsuccessful it will scarcely cause any detriment to the patient, although frequently a temporary debility is not to be denied. An apparent though transient exacerbation of the symptoms as the result of active treatment is also occasionally present in those cases in which a remarkable improvement afterwards takes place.

After a conscientious examination of the results attained during a number of years in by far the greatest number of tabetic patients the bath cure of Aachen can be strongly recommended as specially suitable for being used simultaneously with the inunction treatment.



XI.

SYPHILITIC DISEASES OF INTERNAL ORGANS.

BY

J. THISSEN, M.D.





**I**N the treatment of syphilis in whatever stage it may present itself the Aachen baths and the methods of cure practised here indisputably hold the first rank. It would be proceeding in opposition to established facts if any one were to call in question that which has been so often confirmed by both patients and physicians. Far be it from us to criticise other methods of treatment in this paper, the object of which is rather to show what our treatment can do for syphilitic diseases of internal organs. This appears to be all the more necessary since many diseases of this class are misinterpreted partly as regards their etiology, because they are not looked upon as due to syphilis, and partly because they are imputed to the use of mercury the sovereign remedy for syphilis.

Since Virchow's work "Die Natur der constitutionell-syphilitischen Affectionen"<sup>1</sup> and his book on tumours and also Beer's "Die Eingeweide-Syphilis" have clearly explained the syphilitic process in internal organs the treatment of these diseases has certainly improved in many respects. We have learned how to distinguish lung infiltration from phthisis, we have seen diseases of the liver and kidney disappear in which formerly no one dreamed of a cure. But there is still much work to be done in this field of internal disease. Moreover, in no other chronic

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<sup>1</sup> Virchow's Archiv. Bd. XIV.



disease of internal organs have remedies yielded us such brilliant results. We must therefore attack the disease as soon as possible in a proper manner so that irreparable injury may not take place through its longer continuance.

We will now consider what can be attained by our treatment as regards the clinical appearances presented to us by internal organs affected with syphilis and will begin with the diseases of the lower part of the respiratory tract.

As in diseases of the larynx, which we do not further consider here, we find a syphilitic catarrh of the bronchii, gummata and ulcers, the product of their degeneration. The higher in the trachea a large broken down gumma is situated the greater the danger of suffocation and the more important the disease as regards the functions of the lungs generally. The prognosis is very unfavourable in warty stenosis of the wind pipe resulting from the cicatrisation of ulcers. Even the use of tubular dilators before contraction has occurred can do little in the way of preventing stenosis. It is far better to attack *tracheitis gummosa* at once energetically so that the gummatous infiltration of the mucous membrane may be absorbed before ulcerous degeneration of a gumma can take place.

The lower the gummatous process occurs in the bronchii the less severe is the effect of a single focus on the entire organism, it must be of course understood that the diseased bronchii are neither very numerous nor affected to any very great extent. The ulcerous degeneration of the gumma in the mucous membrane excites a perichondritis of the bronchii with which, in the further progress of the disease, peribronchitic inflammation with connective tissue proliferation may be associated. In this way bronchiectases may be produced, or stenosis may take place in the smaller bronchii through cicatrisation so that possibly such a diseased spot may assume the aspect of beads. The physical signs are chiefly those of bronchiectatic cavities, and by no means least, the copious expectoration—broncho-blennorrhœ—which usually is associated with such cavities. Erosion of the vessels and thereby more or

less severe hæmorrhage, also occur, much more frequently than in phthisical cavities and in a comparatively early stage of the disease, probably the vessels being affected also by syphilis.

It seems to me that a disease of the blood vessels yet to be discussed plays a not unimportant part in this and that the syphilitic defects in the brittle vessel-walls tend more easily to hæmoptysis than do the relatively more resisting vessels in phthisical patients. This is all the more to be expected since by the violent cough of syphilitic patients which occurs in the beginning of the disease the lateral pressure in the blood vessels is much increased and which the brittle walls of the vessels cannot long withstand.

As already mentioned, the diseased state of the bronchii leads also to inflammation of the surrounding tissues: thus syphilitic interstitial pneumonia may develop. This may, however, be quite independent of the bronchial affection which may arise in some measure as a disease *sui generis* and present the same physical signs we are accustomed to find in pulmonary phthisis. The same symptoms are present on percussion and auscultation in both diseases.

Formerly the term syphilitic phthisis was used. It appears to us, however, to be more correct to omit the expression *phthisis* here in order not to cause any confusion with tuberculosis. At the present day the existence of the latter disease is indisputable if we find the tubercle bacillus in the sputum. The absence of the bacillus from the expectoration does not always completely exclude tuberculosis, but makes it doubtful. It is possible that a lung infiltration (at least in the early stage) may be tubercular even when no bacilli have been found in the sputum. It is likely that such doubtful cases may arise from a syphilitic basis. Tuberculosis may also occur, however, in combination with syphilis and may render the correct diagnosis of a lung infiltration extremely difficult. An individual predisposed to phthisis may acquire syphilis. The question then arises: is the lung disease which subsequently develops of a syphilitic or tubercular nature? Formerly the view obtained that syphilitic lung infiltration attacked the

right middle lobe exclusively. Now-a-days this view has been abandoned and we know that the bases of the lungs may also become affected by syphilis, so that this important point has become useless for purposes of localisation. However, the middle lobe of the right lung's is the seat of election and statistics consequently show that the right lung is more frequently attacked than the left.<sup>1</sup> If the seat of the lung affection should be in the apices the diagnosis is rendered still more difficult.

Virchow, in his work "On the nature of Constitutional Syphilitic affections" expresses himself in a very reserved manner on the subject of lung syphilis. Although now, thirty years later, as the result of accumulated experience we know more about the lung affection still many cases remain doubtful and their true nature is made clear only by the results of the accompanying treatment. Yet as syphilis accelerates the course of tuberculosis of the lungs, so do its specific remedies, mercury and iodide. The specific treatment is always a two-edged sword in the case of a phthysical patient and in most cases the results are unfavourable. Caution is therefore extremely necessary in such cases. If the tubercle bacillus is proved to be present, the diagnosis is all the more certain. If no bacillus is found and the patient has previously had syphilis, especially if his general nutrition contrasts with the extent of the local affection and if there is no phthysical predisposition, then a prospect of a cure certainly offers itself. Exacerbation, formation of cavities, loss of strength on the other hand tend to exclude the possibility of cure in doubtful cases.

The opinion that syphilitic infiltration of the apices of the lungs is not attended with fever is now no longer tenable. As we will show, in a case to be quoted, the fever may be not only of a high degree, but is overcome only by energetic measures and is accordingly no contra-indication to specific treatment. The expectoration in syphilis of the lungs is generally more copious than in tuberculosis and is partly formed and maintained by bronchiect-

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<sup>1</sup> Ruhemann "Ueber Lungensyphilis". Inaug.-Dissert. Berlin.

atic cavities. Frequently gummatous particles of lung tissue or bits of cartilage are found in the expectoration, elastic fibres only seldom.

Attention has been called quite recently to a very important symptom: the violent dyspnœa which bears no proportion to the extent of the disease and which usually occurs towards evening. We have already mentioned the more frequent occurrence of hæmorrhage than in phthisis.

The diagnosis may also be made from the history and any remaining syphilitic symptoms as well as from the absence of heredity and the phthisical constitution taken in conjunction with the symptoms already mentioned. To the latter we have still to add that in the cases of lung syphilis besides the catarrh existing in the region of infiltration, a diffuse catarrh of the larger bronchii spreading over the entire lungs will generally be observed and in recent times special stress has been laid on this symptom by the authors.

Treatment should be commenced early and it is to be remembered that in the later stages of the disease tubercle bacilli become lodged as it were in a suitable abode and may render every therapeutical effort futile.

In contrast to the infiltration of entire lobes of the lungs isolated gummata of the lung tissue run an almost symptomless course and rarely present themselves as such for treatment.

We may, perhaps, be permitted to give by way of illustration an account of a case which appears in many respects to be valuable as regards the symptoms and treatment already mentioned. Geheimrath Dr. Mayer has had the kindness to give us the details of the following case for publication:

Herr N. N. aged 33, a Russian merchant, having been infected in 1868 and having been already treated for various symptoms by several courses of inunctions and other methods, came here in the summer of 1881 on account of a lung affection. It appeared from the letter of his physician that the patient suffered from a violent, persistant cough and at the same time had a syphilitic



affection of the skin. These symptoms had got worse during a stay in various places in the South. In the summer of 1879 the sputa were often stained with blood and a course of treatment at Gleichenberg had no result. The lung affection continually grew worse. In the spring of 1880 he had diffuse bronchitis with consolidation of the middle lobe of the right lung and at times fever. The affection was now considered to be syphilitic and on the use of iodide of potash improvement set in, but during the winter the symptoms again grew worse. He now had iodide of potash and the green iodide of mercury internally. As there was no longer any doubt as to the nature of his disease he now came to Aachen. Dr. Mayer describes the condition of his lungs as follows: Dulness over the upper lobe of the right lung in front and behind where it reaches to the middle of the scapula whilst in front it extends to the second rib. Very marked bronchial breathing, increased vocal resonance with crepitant râles over the upper lobe behind. At the present moment there are still spots of psoriasis on the hands and many spots on the skin generally are still visible. Temperature raised. Pulse 96. Body weight 136 lbs. Latterly the patient has had regularly recurring hæmoptysis in the morning. He was ordered one glass of Elisenbrunnen daily, a bath at  $28^{\circ}$  R. and of 15 to 20 minutes duration after which he had an inunction of three grammes of Ungt. Ciner. He was told to drink as much milk as he possibly could. The course commenced in the 7<sup>th</sup> July 1881. The temperature shewed a morning temperature of  $36.5^{\circ}$  to  $37.2^{\circ}$  C. The evening temperature varied from  $38.2^{\circ}$  to  $39^{\circ}$  C. in the early days of the treatment. The evening temperature sank from the eighth day to below  $38^{\circ}$  and after the twelfth day was completely normal.

11. June. Evening temperature  $38.8^{\circ}$  C., patient exhausted.

18. June; fever less, stomatitis, treatment interrupted. Iodide of potash 1.5 gramme given daily, also two beakers of sulphur water and a bath of 20 minutes.

28. June. Fever quite gone. Condition of lungs: only slight bronchial breathing in the right upper lobe behind. Resonance

slightly increased, a few râles. Over the left upper lobe behind there were some râles and piping sounds. There is scarcely any difference in sound to be noticed between the right and left sides. Cough less, still some expectoration, patient not so exhausted. He has had fifteen inunctions up to the present.—To day ordered two glasses of the spring; the bath at  $28^{\circ}$  to be continued; inunctions of 3.5 grammes and iodide of potash 1.5 grammes.

13. July. Over the upper part of the right lung there are still some mucous râles and bronchial respiration in an area corresponding with the middle and upper part of the scapula. There are still râles above the clavicle and the bronchial breathing appears more clearly to proceed from the upper lobe. The increased resonance is no longer distinct. Cough very infrequent, and only in the morning expectoration yellowish white. He has had up to-day 26 inunctions. Weighs 131 lbs.

25. July. Weighs 132 lbs. Coughs very little. Up to to-day he has had 39 inunctions. The râles are now only very faint. Bronchial expiration no longer distinct.

4. Aug. 46<sup>th</sup> inunction. Slight stomatitis. Inunctions interrupted.

12. Aug. Some piping sounds in the bronchii here and there. Course of treatment ends. Patient going to Davos for after-treatment.

11. April 1882. Herr N. N. again presented himself. He had passed through the winter very well. In February the cough returned but disappeared later on. Expectoration still present in the morning, but slight. Faint râles can still be heard in the first intercostal space on the right side as well as between the shoulders near the spine, otherwise there is nothing abnormal. In the summer of 1882 the patient went to Baden and Vienna where he underwent a mild course of treatment and has since remained quite well.

As the tubercle bacillus had not been discovered in the beginning of this case it was not sought for again. The result would doubtless have been negative—the patient had not the

slightest hereditary predisposition—as is quite evident from the progress of the cure. For, to use Virchow's words, it must indeed be a peculiar tuberculosis that disappears after the use of mercury.

To the kindness of Dr. Goldstein I owe the following details of a case of syphilis of the lungs with simultaneous disease of the larynx.

A patient aged 37, a merchant, came here for treatment in the summer of 1880. He was married, but childless and had been infected thirteen years previously. In about 1878 he lost his appetite and soon became considerably emaciated. At that time dulness was found over the apex of the left lung with catarrhal sounds. The diagnosis was uncertain. A course at Ems was attended with bad results; an ulcer formed in the larynx with swelling of the vocal cords the mobility of which was also impaired so that in October 1879 tracheotomy became necessary. At this time on account of a suspicion of syphilis an inunction cure of 14 days was commenced which brought some relief to the patient. He arrived in Aachen still wearing the tracheotomy tube; there was a tumour about the size of a pea on the vocal cords which were almost completely immobile. His skin bore the marks of healed gummata, the glands in the groin were slightly swollen. Dulness in front and behind over the left apex with marked vesicular, almost bronchial breathing, corresponding to the area of dulness. There was no proof of a hereditary predisposition to phthisis. The bath and inunction treatment was carried out (30 inunctions each of from 4 to 5 grammes). At the end of the course it was found that the infiltration of the lungs had begun to diminish. On his return home he carried out two short courses. At the beginning of 1881 the canula could be removed and at the end of the same year complete recovery had taken place. According to the verbal statement of his physician the patient has remained well up to the present.

As regards the treatment we may here add that good nourishment, exercise in the open air with occasional expectorants (or morphia in the case of very violent cough), must also be prescribed.

If there is severe hæmorrhage, absolute rest, ice and other hæmostatics are used and at the same time the use of the waters, baths, inunctions and iodide of potash should be suspended.

Diseases of the heart frequently develop in consequence of syphilis and patients suffering in this way come here for treatment. There are diseases of the vulvular apparatus especially of the aorta, as well as of the muscular structures of the heart. Timely recourse to specific treatment has frequently effected much in these affections. For our special practical purposes chronic myocarditis is of primary importance since, as Virchow has already stated, it for the most part arises from a syphilitic basis, and as Friedreich thinks, is for that reason to be met with most frequently in the male sex.

What Stokes understood by "weak heart" is more frequently attributable to syphilis than was formerly thought. Yet it happened that when Stokes himself by chance employed mercurial treatment in his cases he found significant results which he did not attempt to explain. He had at that time unconsciously employed the proper treatment. According to Lancereaux<sup>1</sup> the symptoms of such a myocarditis are: palpitation, with irregular and weak pulse, dyspnœa, precordial pain, discoloration of the skin of the face, cyanosis of the lips, slight œdema of the extremities, with dilatation of the veins of the neck and limbs, increased cardiac dullness, weak heart sounds, sometimes slight vesicular murmur with the first sound, especially at the apex. Towards the end of the disease all the symptoms of cardiac insufficiency are present. If we meet with these symptoms occasionally in a young man, from whose case alcoholism and atheroma can be excluded, we must suspect that previous syphilis is the cause and even if it should be denied and our suspicion is not proved by other symptoms specific treatment should nevertheless be carried out. It is evidently necessary to support the specific treatment by remedies which act directly on the cardiac muscle. Amongst

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<sup>1</sup> *Traité de la Syphilis.* 2<sup>de</sup> édition. Paris 1874.



these digitalis stands first and up to the present similar results have not been attained by any other remedy, not even Strophanthus or Spartein.

Since alcoholism usually has symptoms similar to those of myocarditis we must refer to it in a few words. The cause of the disease may usually be cleared up by the history, moreover, the symptoms of syphilis or its remains are absent from other organs. The *tremor alcoholicus* or other symptoms of nervous disturbance also facilitate the recognition of myocarditis arising from abuse of spirits.

Perhaps, I may be permitted to insert a case here which deserves to be mentioned since the patient has remained quite well for eight years up to the present and may be considered as permanently cured. In his article<sup>1</sup> Dr. Mayer gives the following case:

A staff officer, aged 50, married about five years but childless, was affected in the beginning of 1878 with shortness of breath and palpitation. Considerable difficulty in the discharge of his duties arose from this disease. When I saw the patient on the 17<sup>th</sup> of March 1878 I found the area of cardiac dulness not essentially increased, the heart sounds were pure but rather weak than loud, especially at the apex; a slight double sound was audible over the right ventricle. The pulse was irregular, weak, but not remarkably rapid. From the great obesity of the patient (he weighed over 200 lbs.) I considered the disease as partly dependent on fatty heart and partly on nervous irritation. The patient improved with the use of digitalis and meat diet and made still further progress during a stay in Baden-Baden in the autumn. He passed through the winter tolerably well, although I learned that the patient, whom I had not an opportunity of seeing at this time, suffered severe pains in the right leg which occurred at night in bed. I saw him again on 12<sup>th</sup> March 1879. About this time

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<sup>1</sup> Ueber heilbare Formen chronischer Herzkrankheiten, einschliesslich der Syphilis des Herzens. Aachen 1881.

the heart appeared to have spread itself toward the right and left, there was a distinct diastolic murmur of a blowing character present at the apex, both pulmonary sounds were not intensified. The liver appeared distinctly enlarged, the urine showed a not inconsiderable quantity of albumen and the legs were œdematous. With the continued use of digitalis the œdema disappeared, the swelling of the liver subsided, the apical murmur, which might be considered pre-systolic, naturally had not disappeared. The patient, who had remained some time in Aachen returned home better. In July, however, very marked dropsy again developed which disappeared but slowly with the use of digitalis and diuretics; the violent pain in the right leg was again present, but this time also I had no opportunity to convince myself of the nature of this pain. The patient again passed through the winter pretty well, but I was informed by letter that "aphthæ" had several times appeared on the tongue and the mucous membrane of the cheeks. On the 3<sup>rd</sup> March 1880 when I next had an opportunity of examining the patient I found that the murmur had apparently drawn nearer to the first sound; it was perceptible at the apex over the right ventricle, but was most distinct over the pulmonary artery and least over the aorta. There was strong epigastric pulsation and the heart seemed more dilated to the right. The apex beat was rather indistinct just below the nipple. The patient's weight had gone down to 164 lbs. In the middle of the right tibia there was a distinct painful periostosis with reddened skin; some fresh patches were found on the sides of the tongue, and there were several rupial ulcers on the back. He remembered that he had contracted syphilis eight or nine years previously and that subsequently he had a roseolar rash, ulcers in the throat &c. After a long course of pills he had considered himself cured and had married a few years afterwards. He remained childless as already mentioned, but his wife continued healthy. He was now ordered to take from two to four table spoonful of a 1 in 20 solution of iodide of potash. Even in the second week after beginning this treatment the pains in the leg disappeared and did not return, but on the other hand, according

to a written communication in June of that year, ulcers again appeared on the lips and tongue. I therefore advised an inunction cure at Aachen. The patient came here in July 22<sup>nd</sup> after he had taken over 200 grammes of iodide of potash. He weighed 173 lbs. I was glad to find the normal pulsation in the right ventricle considerably diminished, the murmur between the first and second sound was still distinct, and strongest over the pulmonary artery, the dilatation of the heart towards the right seemed less. In spite of every precaution the inunctions acted unusually strongly on the gums and affected the patient more than is generally the case. I was obliged, therefore, to limit the course of inunctions to twenty-five of 3 to 4 grammes which extended to the 2<sup>nd</sup> September. He had also 28 sulphur baths during that time. He weighed 171 lbs. at his departure. Whilst at home he took iodide of iron and from the beginning of November again took iodide of potash up to one gramme daily; the patient visited me on Dec. 6<sup>th</sup> and I found his condition to be as follows: the heart only slightly dilated on the right side, left ventricle not increased, apex beat indistinct, no marked epigastric pulsation; the murmur audible in connection with the second sound is weak at the apex and over the right ventricle, but somewhat more distinct over the pulmonary artery; it is of a scraping adhesive character; the first sound is pretty distinct and the second somewhat obscured by the murmur. Pulse 80, regular, somewhat soft. Urine pale yellow, sp. gr. 1019, no albumen. Weight 180 lbs. Gums healthy, abdomen soft, though somewhat distended by gas. Liver normal in size, no exudation in pleuræ, no œdema in the legs, appearance and appetite good. Patient is once more able to take long walks, feels no palpitation and no difficulty in breathing. He was advised to continue taking iodide of potash.

Thus the patient was completely cured by antisyphilitic treatment. Dr. Mayer who saw the patient recently has kindly permitted us to publish these details.

Depressing mental conditions appear to have had a determining influence in this case. Thus, as injuries occasionally determine

the localisation of syphilis in certain parts, and as depressing influences and mental overstrain render the central nervous system more susceptible of the poison, so alcohol must be considered as contributing to syphilitic disease of the blood vessels.

It has been known from ancient times (Ambroise Paré, Morgagni &c.), that morbid changes in the walls of the blood vessels, such as atheroma with loss of elasticity caused by a peculiar process of deposition of chalky scales, may be produced by syphilis. Recently attention has been called to this by Heubner who published a work of the greatest importance on this point. The disease-process in question begins in the intima of the vessels where it causes an endarteritis. Since, according to Friedländer, the formation of the usual atheromatous bunch of vessels proceeds from the *vasa vasorum*, there is here a pathologico-anatomical distinction between the two processes. But the fully developed disease, and especially its consequences, such as brittleness of the walls of the vessels, formation of aneurysms with tendency to thrombosis in the smaller vessels, are not to be clinically distinguished from ordinary atheroma. Vascular disease of this kind in young persons who have been previously infected would appear under all circumstances to be suspicious and it cannot be sufficiently impressed upon them that this must be attacked by early antisymphilitic treatment.

The diseases of the arteries of the brain described by Heubner are specially important, although we cannot speak further of them here as they come under the section of diseases of the nervous system. We will only state, what has been pointed out in recent times by Oppenheim<sup>1</sup> that such diseases of the vessels may occur in the spinal meninges and even in the cord itself and may give rise to symptoms which may be confounded with those of tabes. We will consider them here only in so far as they occur in such important situations as the aorta and large arteries.

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<sup>1</sup> Berlin. klin. Wochenschrift 1888 Nr. 53. "Ueber einen Fall von syphilitischer Erkrankung des Central-Nervensystems".



Aneurysms are frequently described, especially those of the aorta, innominate, subclavian, carotid, popliteal, &c. which develop in consequence of endarteritis and which are cured by specific treatment. The walls of the veins are also frequently attacked by the syphilitic inflammation, the saphena vein being a specially favourite site.

Some years ago we cured by energetic treatment (sixty inunctions, and iodide of potash) a patient who suffered from phlebitis of the saphena and consequent excessive œdema of the right leg.

As already remarked, that important disease, syphilitic aneurysm of the aorta, to which we particularly refer here, is not clinically distinguishable from that arising through the ordinary atheromatous process. The symptoms are the same in both. The site, extent, and finally the end are the same in both diseases. Aneurysms are found on the ascending or descending portions of the aorta, chiefly indeed as multiple expansions, they may also occasionally penetrate the sternum or the clavicle, or may extend backwards and erode the bodies of the vertebræ. They may also burst into the trachea, œsophagus, or even the lungs. As the atheromatous process finally results in ulceration which gradually destroys the muscular stratum, on any sudden increase of blood pressure rupture of the vessel takes place a termination we are accustomed to find in atheromatous aneurysm taken in its stricter sense.

The following case may show the effect of our treatment even in advanced arterial disease: Frau N. aged forty-one had never menstruated. She married nineteen years ago and has suffered for a long time from violent pains in the right side of her chest, pulsation in the head and marked vertigo so that she sometimes fell and when walking in the streets was obliged to support herself by clinging to the houses. She became much emaciated and lost her appetite and sleep. On examination the left ventricle was found to be dilated, apex beat strongly marked, the first sound was pure at the apex, but the second sound was marked by a blowing murmur. Over the aorta two loud murmurs were heard audible at some distance with a musical tone. The same loud

musical murmurs were also audible above the aorta and synchronised respectively with the systole and diastole of the heart. They were most distinct immediately above the clavicle and in this place a strong impulse could be felt. These murmurs could also be heard over the right carotid though weaker. There were no sounds or murmurs to be heard in the axillary. Nothing abnormal in the left carotid, radial pulse very weak on both sides, in fact scarcely perceptible. The diagnosis made was insufficiency and stenosis of the aorta with aneurysm of the trunk of the innominate and a suspicion of syphilis was expressed. Indeed on questioning the patient she admitted that she was infected by her husband six to eight years before and that she had undergone several courses of treatment by means of pills. She was now ordered a mixture containing iodide of potash and as she felt better a course of baths and inunctions was given. She had a bath at 28° R. every other day and had a daily inunction of 4 grammes of Ungt. Ciner. and the iodide of potash was continued. At the end of the course of forty inunctions the patient was distinctly better. The murmurs had become weaker, the impulse had diminished and the pulse had become distinctly perceptible. The patient continued to take iodide of potash for some time and was advised to have another course of baths and inunctions after an interval of three or four months. After thirty inunctions the patient was distinctly better and free from all giddiness. Over the aorta both sounds could be heard pure, there was still only a blowing murmur which slightly marked them and which conducted from the dilated spot corresponding to the trunk of the innominate. After another five years, two of which the patient had spent in America, I saw her again. She looked extremely well, but from time to time had slight attacks of vertigo. The pulse was distinct and in place of the former loud aneurysmal bruit there was only a sibilant systolic murmur.

This case, which had existed for two years before its nature was recognised, should encourage us to try specific treatment even in old standing affections of this kind for though they may

be incurable, nevertheless an improvement, by no means to be undervalued, may often be attained.

Passing to the consideration of the abdominal organs we will occupy ourselves next with the intestinal canal. In comparison with the other manifestations of syphilis syphilitic diseases of the intestines are rare. Yet it is possible that it is here indeed that the etiological factor is frequently overlooked and that intestinal diseases of this class are treated by every conceivable means except specific methods. In the literature of the subject we find a considerable number of diseases of the intestine described some of which are recognised as syphilitic at the autopsy; some from presence of other symptoms such as periostitis &c. have been considered syphilitic and treated accordingly, others which had not these accompanying symptoms, after every other means of treatment having been tried without success have been cured through anti-syphilitic treatment having been carried out for reasons connected with the history of the case. If we consider parts other than the mouth and throat we find gummatous diseases of the mucous membrane and their consequences extending from the œsophagus through the stomach and intestines, most frequently in the rectum where they have been most thoroughly observed.

In the œsophagus gummatous infiltrations and ulcers are very often merely an extension of the throat affection. Pain in swallowing combined with dysphagia and often with regurgitation of fluids characterise such affections. A year ago I treated a woman aged forty who suffered from such a dysphagia, and who had also a deep gummatous ulcer on the leg. For eight days the patient had been unable to swallow solid food, fluids also caused considerable difficulty. She had used different gargles, naturally without result, and had become very thin; it was impossible for her to swallow even a small quantity of milk, it was at once regurgitated. I ordered iodide of potash 2 grammes, and later 3 grammes, daily and in the course of a week when the symptoms had improved an inunction cure was commenced. The patient took a bath at 28° R. of half an hour's duration daily and afterwards had an

inunction of 4 grammes (25 inunctions) the quantity was increased then to 5 grammes (25 inunctions). Under this treatment the deep ulcer of the leg was healed and the patient has been healthy ever since.

Diseases of the stomach occur with symptoms of chronic or those of gastric ulcer. When long continued treatment has been without result and other serious disease is excluded specific treatment should certainly be tried in the case of a patient who has previously had syphilis. Gastric disease often occurs which does not correspond to the description of a catarrh or an ulcer and which in its further course shows itself to be a premonitory symptom of disease developing in the brain.<sup>1</sup> A young man who had been infected long previously had peculiar attacks of a feeling of fullness and oppression in his chest after meals. These attacks were so violent that he dreaded to take food and became very thin. By chance iodide of potash was ordered for him. The patient improved on this and came for further treatment to Aachen. He was cured in one course, but a year afterwards slight attacks of giddiness and disturbance of speech occurred. A rapid course here speedily cured him. Such cases have been already several times described.

Ulcers in the small intestine of syphilitic origin may be accompanied by diarrhœa and violent pain, however, the character of the disease is not often well marked. Pain especially may be absent. The ulcers may attack Peyer's patches or may extend in a circular direction. Cases have been known in which only the serous and a very thin layer of the muscular coats were the only remains of the intestinal wall at the base of the ulcer. Cicatrization of such ulcers may of course lead to the formation of stenoses of the bowel. Slimy, purulent stools are often characteristic.

Gummatous ulcers may also occur in the large bowel, they are accompanied by colicky pains and alternate diarrhœa and constipation.

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<sup>1</sup> See Brandis "Grundsätze bei Behandlung der Syphilis". Berlin 1886.



Cases of syphilitic disease of the rectum come for treatment here much more frequently than the other affections of the bowels already mentioned. They are partly of an ulcerous nature and partly infiltrations of the connective tissue surrounding the rectum with a tendency to fibrous stricture without disintegration.—We do not refer here to the primary nor any of the early secondary affections about the anus.—The ulcers may be reached by digital examination or by means of the speculum. They are usually accompanied by tenesmus and mucous stools tinged with blood, or else there is obstipation, the latter frequently alternating with involuntary evacuations. Besides the usual general treatment local surgical measures are made use of in these affections. It may be necessary to divide the external sphincter in order to permit scraping the site of the disease with Volkmann's spoon. Insufflations of iodoform or iodoform suppositories placed high up often act well as local means of support to the general treatment.

We must also refer here to *fistula in ano* which may occur as the ordinary rectal fistula, or as fistula in the sheath of the rectum which often proceeds from broken-down gummata in the circumrectal connective tissue and is also suitable for the usual treatment here.

It is well known that syphilis of the intestinal tract is very often hereditary and is met with in the youngest children. We will, therefore, not omit to mention that children from about two years old may undergo a course here which is naturally modified and very carefully conducted. As is shown by many instances the results generally speaking fulfil the anticipations. Cures are by no means rarely effected in such children who have been treated elsewhere for months for chronic diarrhoea without success.

Passing to the glandular organs of the abdomen we take first the largest of them: the liver, which was known as the favourite site of syphilis even to the old pathologists. According to the old fashioned idea the special symptoms of the disease flowed from the liver as from an inexhaustible source. As a matter of fact this gland is often enough attacked by syphilis. The liver may

be affected in the earliest stages and numerous cases are known in which jaundice developed even before the appearance of the roseolar rash. Catarrhal jaundice naturally suggested itself but the course of the disease proved that this symptom was called forth by syphilis. It is indeed most likely that swollen lymph glands exercise pressure on the bile duct preventing the flow of the bile and in this way lead to icterus. Specific treatment in these cases soon removes the jaundice which defies measures that would be suitable under other circumstances. In the later stages of syphilis, however, diseases of the liver occur more frequently and are of far greater importance. Such diseases do not necessarily delay their appearance for some years, as is usually the case, but may develop in the course of a few months. We gather from Peiser's statistics<sup>1</sup> that a case occurred in two-and-a-half months from the date of infection, most cases occur in from two to seven years after which in the later stages they again become more rare.

As in the case of so many syphilitic diseases of internal organs, those of the liver are difficult to recognise. Indeed syphilitic affections of the liver occur often enough which present no distinct picture of any disease and which become evident only at the autopsy from the presence of complications such as amyloid degeneration of the kidneys &c. It is here again important to make the most of what we can gather from the symptoms in order to arrive at the earliest possible correct diagnosis. The later such cases come under treatment the less one can promise from the specific treatment.

The first symptom usually mentioned by the patient is pain in the region of the liver. Almost all syphilitic liver diseases are accompanied by a perihepatitis. This localised peritonitis may attack a small portion of the liver, one of its lobes or even the entire organ. It produces at the same time a feeling of fulness, oppression and difficulty of breathing.—If the syphilitic process is a

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<sup>1</sup> Die Lebersyphilis von Dr. Peiser. Letpzig 1888.

general inflammation of the connective tissue of the liver proceeding from Glisson's capsule, the symptoms which characterise cirrhosis of the liver become more marked. If the syphilitic lesion is localised as a tumour in the liver other symptoms occur which correspond in appearance to those of tumour formation. Both processes may attack the organ at the same time and a complicated condition may be the result.

In a manner analogous to that in cirrhosis the proliferation of connective tissue is accompanied at first by swelling of the organ and later on by contraction and atrophy. According as the patients come early or later under treatment the liver is either enlarged or contracted and when it can be felt is found to be studded with granules which are smaller than those in cirrhosis. In the later stages there may be, in addition, symptoms of obstruction of the portal vein: ascites, œdema, diarrhœa, enlargement of the spleen &c. These symptoms are not characteristic of syphilitic cirrhosis other evidence of recent recurring or arrested syphilis must be forthcoming to support the diagnosis of this syphilitic interstitial hepatitis.

Syphiloma of the liver is in many respects simpler though not always so easy to recognise as it appears to many. If the syphilomata are at all large and so situated that palpation is possible then their recognition is extremely easy. We have then to do with an enlarged organ on the smooth surface of which we can detect nodular tumours. If the tumours are soft one gets the impression of a sort of umbilication; indeed, when cicatrisation by connective tissue has taken place after the absorption of the syphiloma, it is possible that a furrow may be present in the liver. Such furrowed livers have often been described as the result of syphilitic disease; it does not follow that they are always the consequence of tight lacing although it must be added that through the limiting influence of the tight lacing a syphilitic person may be attacked by localised syphilis of the liver. As in syphilitic contraction of the liver, the consequence of syphiloma is that a certain number of liver cells, blood vessels &c. are destroyed and

that by cicatrisation of gummata in the later stages obstruction of the circulation in the portal vein must take place. In this way ascites, anasarca, swelling of the spleen, catarrh of the stomach and intestine with diarrhœa and occasionally vomiting of blood or passage of blood in the stools may take place. True icterus, such as we see in other severe diseases of the liver, is very seldom met with in syphilis of the liver. The colour of the skin is for the most part earthy, dirty brown or even bronze.

The diagnosis between syphiloma and carcinoma presents some difficulties. The age of the patient as well as the configuration of the tumours come into consideration (the syphilitic tumours are more circumscribed and not so round as those of medullary cancer). The cancerous liver grows under observation, the syphilitic diminishes through cicatrisation. Ordinary sclerosis may be excluded if there is no history of abuse of alcohol, also (as it appears), if the left lobe of the liver is less contracted than the right.

As already mentioned the symptoms and appearances of syphilitic affections of the liver are obscure in many cases. The history of the patient and evidences of previous or still existing syphilis in other organs must be taken into account to help the diagnosis and treatment. Though it was formerly believed that patients with syphilis of the liver were doomed, we now know that many cases even of long standing are cured by the treatment here.

A patient from Roumania, aged 38 suffered for the past year from pain in the region of the liver, general debility, pallor of the mucous membranes, weak husky voice as well as hæmorrhoidal trouble. Besides this he had pain in the left hypochondrium (Perichondritis syphilitica). He had been treated at home by means of inunctions and iodide of potash without any striking result. In addition to his other troubles there were also pain in the stomach and regurgitation of food. The liver was considerably enlarged: about 4 fingers breadth. The left lobe was especially swollen and very painful on the least pressure. On careful palpation some



large and small round projections, painful to touch could be perceived on the surface of the liver. The spleen was enlarged, especially in width. There was a well marked hæmorrhoidal nodule which had not bled for a month. The patient contracted syphilis 14 years previously and lived in childless wedlock.—His wife suffered from uterine trouble and had aborted on one occasion. His treatment here consisted in drinking two glasses of the Elisenbrunnen daily together with a bath of half an hour at 28° R. and an inunction of 3 grammes of Ungt. Ciner. After 30 baths and inunctions the patient left finding himself well; he then spent some weeks at a hydropathic establishment. In the following year he came back for further treatment; his liver was no longer enlarged and his general health and appearance were very good. He underwent a short course of 15 inunctions and was then advised to take iodide of potash for a considerable time.

Syphilitic affections of the spleen may be observed even in the early stages of the disease. A hyperplastic swelling on the spleen occurs directly on the outbreak of the roseolar rash resembling that which occurs in enteric fever and which subsides with the disappearance of the early secondary symptoms on the use of antisyphilitic treatment, but it cannot be demonstrated in all cases. In the late stages tumours of the spleen may occur, (amyloid degeneration we will not further refer to since it is for the most part unsuited for our treatment) also, according to Virchow, there is, a soft and a hard hyperplastic swelling of the spleen which comes here for treatment, usually in combination with affections of the liver. These latter are to be regarded as resulting from obstruction in the portal circulation and generally subside when the primary disease of the organ is cured.

Those tumours of the spleen which occur in combination with swelling of the lymph glands resembling leukaemia are to be considered of practical importance. Some cases have been described in which such leukæmic conditions are cured at last by anti-syphilitic remedies after other treatment having long been tried in vain. In hereditary syphilis as has been proved by Birch-Hirsch-

feld and Haslund enlargement of the spleen occurs in almost all cases. One has to take this point into consideration especially in the treatment of children.

It was known in early times that the kidneys became affected in syphilis but this knowledge appears to have again been forgotten. It was chiefly Virchow and Beer who once more thoroughly described syphilitic affections of the kidneys. The disease of the kidneys is not to be distinguished symptomatologically from Bright's disease. All three stages of that affection occur: acute parenchymatous, large white and shrunken kidney; moreover also amyloid degeneration. Pathologically syphiloma is alone characteristic of syphilis. The diagnosis can be regarded only as probable when there is pain, chiefly in one, side since gummata are for the most part unilateral. However, one can scarcely be certain about such an opinion and other accompanying signs of syphilis must be taken into account and the diagnosis finally settled *ex juvantibus*. It need scarcely be said that a course at Aachen is of great value in diseases of the kidneys, especially the hot baths and vapour baths followed by sweating for some hours. They serve better than anything else to relieve the diseased organs by favouring diaphoresis. Other internal remedies are used if necessary and at the end of the course iodide of iron is indicated for a long time.

A case of albuminuria in connection with syphilis may perhaps be quoted here, it excites our interest by its course and the cure obtained after several years. It shows that we must continue the treatment of these affections for a long time before a permanent cure can be attained. On 26<sup>th</sup> July 1882 a gentleman aged 27, a philologist, came here for treatment. He suffered from violent pains in the head and legs and his urine on examination showed a considerable quantity of albumen. He had been infected fourteen years before and had tried several inunctions and courses of iodide of potash. He had suffered from psoriasis since his twelfth year. The urine as stated contained much albumen, reaction acid, sp. gr. 1030; very slight sediment. No casts were found. He had

a course of 30 inunctions and a daily bath at 30° R. after which he sweated. He also had two litres of milk every day, but no stimulants. After thirty inunctions an erythematous rash of red looking spots appeared which grew worse and the treatment was interrupted after the fortieth inunction. The patient now took the well known iodide of potash and iodide of mercury mixture internally and had a daily bath at 30° R. (40 to 45 minutes) with subsequent sweating. He afterwards went through a long sweating course at home and took alternately iodide of potash and red precipitate internally. The urine still contained much albumen. On the 18<sup>th</sup> May 1883 slight hypertrophy of the heart was detected and hot baths with iodide of potash were prescribed. The inunctions were resumed on the 10<sup>th</sup> May beginning with 4 grammes and increasing to 5. In all he had sixty inunctions. The albumen considerably diminished during this treatment. No casts were found. Sp. gr. fluctuating between 1016 and 1024. During the treatment the patient drank 2 litres of milk daily, but took no stimulants, the baths were at 30° R. and he remained 40 minutes in them. In the middle of July the patient went to Norderney for sea bathing.

On 12. Jan. 1884 the urine sent here was examined. It was almost free from albumen, that is to say it was always free in the morning but contained some albumen at night. On 14<sup>th</sup> May 1884 the examination gave the same result. Patient went again for three months to the sea. At the end of October he wrote that he felt very strong. Albumen was no longer present in the mornings, in the evenings was one third per 1000. He now went to Arco for the sake of the climate and there continued the milk treatment. He remained there during the winter and afterwards went to Geneva. On July 20<sup>th</sup> 1885 it was observed that the urine was free from albumen in the evening as well as in the morning. The health of the patient had been very good for a long time.

From the course of the disease and its cure by specific treatment—the patient still took iodide of potash quite lately—

the albuminuria must be considered syphilitic. It occurred three or four years after infection and was certainly, though slowly cured by protracted treatment. From the nature of the symptoms the kidney affection may be considered as the second stage of Bright's disease with a syphilitic basis.

Gummatous ulcerations may also form in the bladder. Besides violent pain and frequent micturition they cause more or less severe hæmorrhage and excretion of pus.

In concluding the diseases of the uropoetic system we may briefly mention diabetes mellitus and insipidus both of which may occur in consequence of syphilis. Although little is known of their nature a sufficient number of cases have been described which have been cured by antisiphilitic treatment.

A form of paroxysmal hæmoglobinuria recently described by Murri (Bologna) also by Schumacher (Aix la Chapelle)<sup>1</sup> is still in dispute as regards its dependence on syphilis.

Ponfick thinks that such a condition may arise directly after the use of mercury. We on the contrary can ourselves cite a case which conforms Schumacher's Views and we are also of opinion that in all such cases with previous syphilitic infection, specific treatment is urgently called for. A year ago we treated a patient aged 32, otherwise healthy, who also came of a healthy family. He had contracted syphilis seven years before and had had several courses of pills, which, however, were not well borne, and, as it appears, was afterwards cured of his secondary symptoms by Zittmann's method and iodide of potash. No fresh symptoms occurred up to three years ago. At that time in consequence of a cold there was hæmaturia which returned once or twice and disappeared. It frequently recurred during last year. The attacks took the following course: as the result of slight exposure to cold, especially in damp weather there is pain in the region of the kidneys, at the same time a feeling of cold followed by a dragging sensation in

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<sup>1</sup> Schumacher, "Beitrag zum Zusammenhang von paroxysmaler Hæmoglobinurie und Syphilis". III. Congress für innere Medizin. Wiesbaden 1884.



the penis, then there is a desire to micturate with an intense feeling of cold over the entire body. The patient then voids about half a litre of urine tinged with blood with violent pain, after that the attack passes off and the urine then becomes normal. These attacks have been very frequent lately, about every eight days. He had one during the journey to Aachen. The treatment consisted in drinking two glasses of Elisenbrunnen, a bath at 28° R. of half an hour's duration and inunctions of ungt. ciner. 4 grammes. Two days after beginning this treatment an attack took place in cold damp weather; but not since. The patient was able to have only 28 inunctions here, 10 of 4 and the rest of 5 grammes each. During the last 14 days he drank three glasses of the waters daily. He wrote to me afterwards that he had gone from Paris to St. Petersburg in very severe weather, that he had paid but little attention to the rules laid down by me, had lived quite irregularly but that in spite of all this he had had only one attack in November. He will repeat the course here in a few months. Whether the hæmoglobuniria in these cases is due to a gumma in the kidney substance, or whether (what is more probable to me) the vessels of the kidney are diseased has not been clearly established. Be that as it may, specific treatment, as already mentioned, is distinctly indicated.

We have yet a few words to say on the syphilitic diseases of the male sexual organs, periorchitis, interstitial orchitis or formation of gummata in the testicle. The diagnosis from gonorrhœal, tubercular or carcinomatous tumour is all important here. Early treatment is all the more indicated since destruction of the affected structures may take place if there is long delay. This must be considered not only on account of the patient himself but also for the sake of eventual posterity.

Pathological anatomy has long ago proved the existence of syphilitic affections of the female reproductive organs, especially oophoritis, gummata in the ovary, or chronic metritis with gummata in the uterus. It appears to me that up to the present the etiology of chronic uterine and ovarian diseases is too little

considered. Why should not energetic treatment render as important service here as in other organs before hardening and contraction of these organs has rendered dangerous operations necessary—and these only for the purpose of palliation? may we not also in this department of gynæcology overlook the true cause and delay so as to let slip the best time for attaining a cure or at any rate permanent improvement. By laying to heart the old proverb "*principiis obsta*" many unhappy women may be relieved.





XII.

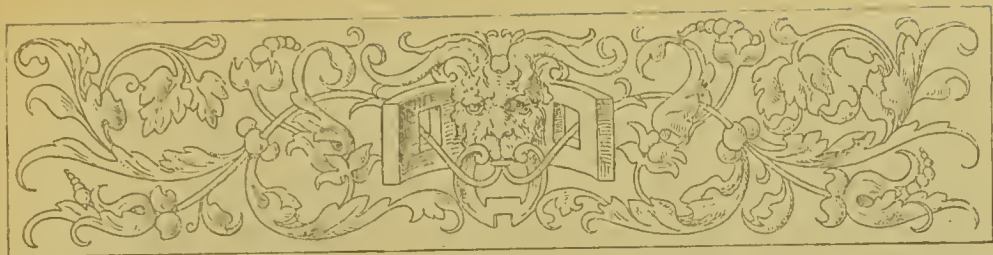
CHRONIC METALLIC POISONING.

BY

CARL SCHUMACHER, M.D.







**T**HE use of many metallic remedies is very ancient and the medical science of the present day cannot dispense with the active properties of the metals or their various combinations in combatting local and general disease. Nevertheless the beneficent activity of metals becomes a grave danger both to health and life when the limits fixed for their absorption and excretion by the organism are not observed.

In spite of careful investigation it is difficult to determine, save in a few instances, the point of time at which the injurious effects of these agents is exercised. The long duration of several diseases extending over months and years, requires persistent treatment with large or small doses of these remedies and favours the overloading of the body with them all the more as the latter possesses a great power of accustoming itself to their presence.

The excessive use of metals excites a sickness which combining with the original malady at once impresses on the latter a peculiar stamp and this in consequence of its cause is called chronic metallic poisoning. The most important forms are those of chronic mercurial and chronic lead poisoning which we have to consider separately.

## CHRONIC MERCURIAL POISONING.

Of this disease we distinguish two forms: that acquired in certain manufacturing processes and that produced therapeutically during the treatment of syphilitic diseases. The first represents the pure form of mercurialism and formerly was observed frequently in the mirror factories of Aachen and its neighbourhood, but is now seldom seen here. Mercurialism arising from the treatment of syphilis, according to the system of other authors is designated hydrargyrosis and is that referred to in the following paper.

Hydrargyrosis is by no means a rare disease. It has lost some of its earlier terrors now that the mercurial treatment of syphilis is so much better regulated. It is accordingly not often a severe malady. It may, however, produce a very troublesome condition which may last for weeks and even in mild attacks may disturb both the plan and results of our treatment. It causes painful swellings on the mucous membrane of the mouth and throat with superficial destruction of the tissue, it increases the activity of the glands to salivation and by a similar process in the intestinal canal, through the irritant action of the mercury, it gives rise to colicky diarrhoea and furnishes many causes of impaired nutrition.

In addition to the local lesions caused by the too long continued action of mercury it also gives rise to many manifestations of diminished nervous force. In this manner may arise fever, poverty of blood, debility, tendency to severe perspiration, restless sleep, attacks of vertigo, which may proceed to temporary loss of consciousness and great psychical irritability or depression. I would here call particular attention to a class of cases which are partly doubtful and which are attributable not to mercury, but to hot baths and nicotine. I have tried as far as possible to exclude both these conditions in order that the complex symptoms of so widely distributed a disease as hydrargyrosis may be given correctly.

The diagnosis of the disease caused by the excessive use of mercury would be easy if it depended only on the symptoms already mentioned. We cannot, however, forget that abortive forms of hydrargyrosis may be present in the mouth, which are not accompanied by fetor, or softening of the gums and which take place without salivation or any impairment of the general well being. These forms occur on the tongue and especially the soft palate and tonsils either as losses of tissue or deposits, resembling the specific papules of the mucous membrane, or as ulcers which individually as well as collectively resemble the more quickly or slowly appearing irritation symptoms of early syphilis. But in reality they depend on the local corrosion caused by the saliva which contains mercury and which affords a suitable nidus for various morbid organisms.—Local hydrargyrosis accordingly appears to me to be the most suitable name for these forms.

These abortive forms of the disease may disappear in from ten days to three weeks, but they frequently drag on a chronic course for months changing their site and whilst healing in one place, they surprise us in another by new forms which remind us of analogous appearances in early syphilis. On the other hand fresh syphilitic eruptions may appear on the same portion of the mucous membrane whilst the rest of the body may remain free of syphilitic marks. It is therefore evident that from the association of syphilis and hydrargyrosis complicated conditions may arise which may easily confuse the diagnosis.

A large clinical experience will enable one to give a correct interpretation of the greater number of these doubtful cases, but it is not able to do so in all.

A chemical examination of the urine and fæces has been recommended as a complete solution of the difficulty. Accordingly, during the last year all patients presenting themselves to me with mercurial disease of the mouth, both the fully developed as well as the abortive cases, have had the excretion of the metal in combination with the urine tested. In the fully developed cases



the negative results predominated, in the abortive the positive and negative results were about equal.

These results of the analysis of the urine are not to be taken as accidental and they destroy the certainty ascribed to them as a means of diagnosis. There remains the examination of the fæces. This should give trustworthy results, yet there is so much against it that I wished for a simpler method of settling the differential diagnosis.

The negative results of the urine test, even in marked mercurial stomatitis, prove that the cavity of the mouth may be affected by the action of the mercury before the latter has had time to accomplish the long journey from its usual place of absorption, the skin, to the excretory organs and that the saliva is capable of yielding the metal in combination sooner than the urine. It is, therefore, better to seek for symptoms in those parts of the mucous membrane which come into direct contact with the mercurial saliva and which enable us to decide between local hydrargyrosis and syphilis. There must be changes which are not caused by syphilis and which always take place only through overloading of the body with mercury.

In 1886<sup>1</sup> I reported the results of many years observation and comparison of cases and I have since collected twenty other examples which support the views laid down in my paper published at that time, that in the course of mercurial treatment unmistakable, important diagnostic signs develop in the lower pharynx which enable us to decide between syphilis and mercurial poisoning as regards the mouth and consequently as regards the entire body. Until 1886 there was no account of this mercurial disease of the lower pharynx in any text-book or medical journal, whilst from that time my local and foreign colleagues have observed this condition and have valued it as a certain aid in clearing up doubtful cases.

The diagnosis of hydrargyrosis of the lower pharynx can only

<sup>1</sup> Verhandlungen des 5. Congresses für innere Medizin. Wiesbaden, 1886.

be established by means of the laryngeal mirror and requires careful examination. It depends on the presence of separate or crowded groups of white or yellowish gray formations or deposits of from  $\frac{1}{3}$  to 1 cm. in circumference which after previous clouding and diminution of the lustre of the mucous membrane assume either an acute or a chronic form and are placed on a circumscribed reddened base.

The disease involves the region directly below the circumvallate papillæ of the tongue as far as the entrance of the larynx, or the upper part of the œsophagus. It begins in and between the papillæ of the mucous membrane which are formed by the mucous glands and the large follicles at the root of the tongue. It may, however, pass over to the back wall of the pharynx or it may reach down behind the epiglottis to the glosso-epiglottic fossa and may develop on the mucous membrane of the lateral dilatations around the entrance of the larynx. Its favourite site is on the folds in the mucous membrane which extends from the epiglottis to the pharynx and the posterior surface of the covering of the arytenoid cartilages.

These deposits may produce local ulcerous destruction and cause serious swelling of the gland at the upper edge of the thyroid cartilage on one or both sides and in those of the region of the hyoid bone. They generally occur unnoticed, without the usual signs of mercurial stomatitis, but if completely developed they may cause very great difficulty in swallowing with pain in the corresponding ear so that many patients erroneously believe the latter to be diseased. In some cases remarkable disturbances of speech and general health occur which do not correspond with the extent of the anatomical changes but which are solely dependent on the situation of the disease and for several days may be attended with fever with an evening rise of temperature to  $39^{\circ}$  C. These severe complications are accompanied with rapid emaciation.

As a rule the localised hydrargyrosis of the pharynx precedes the disease in the mouth, yet it is not followed by the latter in every case. It cannot be confounded with early syphilis because

this very rarely attacks the lower pharynx; it is sufficiently distinguished from the totally different nodular syphilide and the other diseases of the pharynx and owes its origin only to the continued contact with mercurial secretions flowing down from the mouth and throat.

The importance of the recognition of this disease lies in its clinical significance as regards the differential diagnosis. It justifies the conclusion that suspicious conditions of the body, the origin of which is not clear, especially those occurring in the cavity of the mouth, are due, not to syphilis alone, but to a combination of the mercurial poison with syphilis, that is to say hydrargyrosis.

When this disease occurs it becomes urgently necessary that every form of mercurial treatment should be suspended and should be resumed, if required, only when the affection of the throat has been cured.

After stopping the inunctions, from one to three weeks must elapse until by gradual diminution of the deposits or the separation of sloughs and cleaning of ulcers the normal mucous membrane is re-established without cicatrices. The subjective troubles disappear in about the same time, though they sometimes take longer than the reparative anatomical changes. We support the healing process by warm mineral baths, weak (1 per cent) solutions of chlorate of potash, nitrite of silver and tincture of iodine, by painting with cocaine, but chiefly by careful fluid diet.

If we compare the laryngoscopic examination of the lower pharynx with the analysis of the products of the kidneys and intestinal canal as an aid to diagnosis the scale will turn in favour of the former. For even repeated analyses establish only the occurrence and duration of the excretion of mercury and permit us to observe its increase or diminution on the colorimetric scale, but they do not show the exact excess of quicksilver absorbed. On the other hand the simple recognition of hydrargyrosis in the lower pharynx proves the presence of an overcharge of mercury and marks also the point of time referred to in the beginning of this paper in which the remedy as used therapeutically begins

to exert its local and, if continued, its general pernicious influence.

The examination of the lower pharynx with the mirror is not difficult with ordinary skill and can be made in a very short time. It guides us to a certain conclusion and shows us the way to a proper treatment. It also gives valuable aid in the diagnosis and treatment of syphilis and will, I trust, become of permanent use to my colleagues in specific treatment.

Passing to the treatment of chronic mercurial poisoning we find that the preference has always been given to sulphur baths by patients suffering from that disease. The experience of the present time also shows, in contrast to the undeniable effect of astringents and chlorate of potash, that the chief part of the task of freeing the body from its excess of the metal in combination is borne by the thermal bath- and drinking-cure. The statistical proofs of this cannot at present be put in evidence, but we cannot shut our eyes to obvious facts.

The sulphur bath also possesses valuable powers for preventing the overloading of the system with mercury used therapeutically. It is true that a number of factors are found combined at the bathing places which facilitate the inunctions so that having regard to the nutrition and general health of the patients it is difficult to exclude from the list of tried remedies any one means, but the action of all is supported and rendered complete by a generous use of the thermal treatment. If the daily treatment of syphilitic patients teaches us that many, after repeated vain attempts in other places, are here able to bear the necessary energetic mercurial treatment usually without any disturbance of their general health, the favourable transformation in the course of the treatment must be ascribed to this means which is present as the one new factor in addition to the previous plan of treatment and this is the sulphur baths.



## CHRONIC LEAD-POISONING.

Thanks to the better precautions and the greater regard for personal security chronic lead poisoning has become rarer than formerly, still cases occasionally come here for treatment.

This disease is caused by the long continued absorption of lead from the digestive organs, the nose, the respiratory tract and the skin. And this storing up in the body is favoured by the evil influence exerted on the principal excretory organs, the intestine and the kidneys, by the lead.

In some cases the metal, by a process of slow poisoning, permeates the entire body and manifests its pernicious properties, though in a varying degree, in each individual organ. Its presence has been frequently demonstrated in both the hard and soft tissues of the body. It has been found in large quantities in the bones, kidneys, liver, brain and spinal cord also in the blood and to a less extent in the paralysed muscles. But frequently the blood, muscles, brain and other organs, even of persons who have died of lead poisoning, have been sought in vain for lead.<sup>1</sup> Although the body gradually gets rid of the poison yet it appears that the latter is able to produce incurable disorganisation. On the other hand we may be certain that the lead, having once entered the body, leaves it only very slowly so that long after the absorption by every possible channel has ceased lead may still be found in the tissues.

Amongst the anatomical changes, induced by the lead, contraction and thickening of the muscular coat of the intestine is described and an atrophic condition of the intestinal mucous membrane was discovered by Kussmaul and Maier.<sup>2</sup> The latter also described an increase of the connective tissue and an atrophy of the nerves in the abdominal ganglia of the sympathetic. In the

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<sup>1</sup> B. M. Lersch, *Fundamente der praktischen Balneologie*, pag. 419.

<sup>2</sup> *Deutsches Archiv für klin. Medizin.* IX.

paralysed muscles there is atrophic degeneration with proliferation of connective tissue and shrinking of their segments, whilst the nerves also show varying degrees of destruction. Up to the present we possess scarcely any sufficient knowledge of the condition of the nerve centres, yet the changes in the brain imply incomplete nutrition. The brain is pale and soft, its convolutions are flattened and the sulci between them are widened, sometimes patches of white softening may be found in the hemispheres, this appears to be especially the case in those patients who have suffered from spasms of an epileptiform nature in whose brains lead had been deposited. The spinal cord shows destruction of the gray substance and of the anterior cornua of gray matter with atrophy of its ganglion cells and patches of softening occurring chiefly about the level of from the fifth to the eighth cervical nerves.

The nature of lead poisoning and of the symptoms which it occasions are at the present time the subject of a lively controversy. We venture to think that the participation of the peripheral and central nervous system is of very great importance, that from this association the impulse proceeds at one time irritating, at another paralysing and that in this way the different manifestations of the disease may appear either in a simple or a complicated form. From the fact that it may subside we are driven to the assumption that this disease is merely a functional disturbance of the nervous apparatus, the site of which has been placed, by Erb amongst others, in the gray matter of the anterior column of the spinal cord.

Chronic lead poisoning gives rise to a manifold series of functional disturbances which occur without regular order or sequence and are collectively known as lead-colic, saturnismus chronicus, from Saturn the disease producing planet of the astrologists.

Many of its manifestations are of great interest for us. As a rule after the prolonged action of the lead a disturbance of the general condition takes place which is called the lead cachexia

The patient's skin loses colour, his appetite fails, the pulse is slow, the action of the bowels irregular and he complains of weakness in the legs. There is a slatey-grey or bluish black seam of lead at the edge of the teeth and the spongy gums are characteristic and are due to the deposit of sulphide of lead.

Lead colic is a further consequence. The patients who are attacked by it suffer from nausea and at times from vomiting, but especially from obstinate constipation or the evacuation of small scybala. Violent pains of a colic nature occur in the abdomen which is tense and retracted about the umbilicus. The skin is covered with cold sweat, the breathing is shallow, the pulse slow and hard and the secretion of urine considerably diminished or altogether suppressed.

If the disease goes on to paralysis the latter is usually limited to the upper extremity and manifests itself especially in the extensor muscles of the forearm supplied by the radial nerve. Commencing in the fingers, but leaving the thumb in the first instance intact, the disease gradually involves the other muscles of the wrist supplied by the radial nerve so that when the arm is raised the hand, by its own weight, falls limply down. In England this symptom is called "wrist-drop" or "drop-wrist". The paralysis usually becomes so complete over the entire arm that the patient cannot perform any movements with it. If the extensor muscles are alone involved firm closure of the hand may take place through the unopposed action of the flexors. If the disease of the muscles is more extensive, wasting and atrophy may be added to the paralysis and the arm may shrink to such an extent that the inter-osseous membrane may be felt. Usually both arms are affected, though not to an equal extent. In rare cases the muscles of the legs and back are affected by the paralysis.

The paretic and paralysed muscles lose their direct excitability by the faradic current whilst the galvanic reaction is increased. With progressive atrophy of the muscles this reaction of degeneration may go on to complete loss of electric irritability.

Many disturbances of sensibility are combined with the paralysis, such as a feeling of numbness or formication, neuralgic pains or excessive hyperæsthesia.

In addition to these symptoms there may occur on the backs of the hands oval or long swellings in the sheaths of the tendons which render the wasting of the muscles more apparent.

The so-called encephalopathia saturnina also owes its origin to chronic lead poisoning. It produces pain in the head, vertigo with loss of consciousness going on to epileptiform convulsion, delirium or melancholia.

Finally marked weakness of sight is also known as the result of chronic saturnism which in a single day may occasion total blindness in both eyes and may be accompanied by inflammation or atrophy of the optic nerves.

The importance and danger of this disease consist in the general and local symptoms which it produces. Its evil effects vary from a slight disturbance of health and vigour to the most violent arrest of every function of the body and mind and it may finally threaten life itself.

However, if the cause of the disease is removed in time there is hope of improvement and possibly of cure even in all stages. But we know that the disease if it has once occurred is likely to return if the necessity for guarding against it is not constantly kept in view.

The treatment of chronic constitutional saturnismus is divided into local and general, each of which must complete and support the other.

The internal administration of opium, morphia injections, purgatives, atropine and nitrite of amyl—all tend to relieve the colic.

The local paralyses require local treatment. As long as the muscles respond to electric stimuli good results may be anticipated from the long continued action on the muscles and nerves of the constant or of the faradic current of moderate strength. Injections of strychnine are also strongly to be recommended.



The chief part in the cure of chronic lead poisoning is to be attributed to the general treatment because it accomplishes the removal of the metal stored up in the body. For this purpose iodide of potash has won for itself renown. It combines with the insoluble lead compounds in the body to form new and soluble salts so that the poison and the medicine are eliminated together in the urine.

In order that the remedy may act on the lead-containing organism in the most complete manner, it is important that it should remove the metallic compounds in those watery excretions which leave the body. For experience shows it is extremely probable that by drinking large quantities of water this process is unusually favoured.

Experience also proves that the compounds of sulphur, that is to say, their natural solutions the sulphur thermal waters, have a greater influence both in their internal and external administration than simple water.

Clinical and balneological observations<sup>1</sup> scarcely permit us to doubt that the sulphur waters contribute powerfully to the cure of chronic lead poisoning.

To quote some of the old reports of the extremely favourable results attained in Aachen we find a case of Veling<sup>2</sup> in which a partial paralysis of the upper limbs due to chronic lead poisoning was cured by the internal and external use of the waters here. Hahn<sup>3</sup> has seen two cases of very advanced paralysis of the hand, the result of lead poisoning of long duration, cured by the treatment at the sulphur baths; in one case the disease was due to drinking lead-contaminated rain water for many years and the other to the long continued use of snuff made from tobacco which contained lead. Wetzlar<sup>4</sup> remarks that the results of the internal and external use of the Aachen thermæ are often

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<sup>1</sup> Lersch, loc. cit. 420.

<sup>2</sup> Ibid. 582.

<sup>3</sup> Ueber die Indication der Aachener Thermalkur, 1865.

<sup>4</sup> L. Wetzlar, U. d. Heilwirkungen d. Aachener Schwefelwasser, 1862.

surprisingly rapid. According to Hartung<sup>1</sup> a lady of Holland, through the carelessness of her maid for a whole year, drank tea made with water from a leaden cistern and since then had suffered from pains and very great weakness in all her limbs, colic and constipation. A carefully conducted "cure" of two and a half months here removed these symptoms and sea-bathing in the following year completely re-established this young lady. Reumont<sup>2</sup> describes the case of a landowner, aged fifty, who suffered from emaciation, partial paralysis of the hands, palsy, blunting of sensibility, a tendency to constipation and who had lost forty pounds in weight during the previous year. His disease was attributable to the use of snuff which had been packed in lead foil. The chemical analysis of the snuff by Dr. Wings showed that it contained a pretty considerable quantity of lead oxide. The use of this snuff was forbidden and the six weeks' use of the cure here in all its forms together with some sulphur and rhubarb, brought about a great improvement in his symptoms. In the course of the next three months whilst the patient was at home a complete cure of the paralysis took place without further medical treatment. After two years Reumont was able personally to affirm the normal use of the hands and forearm.

I may perhaps be allowed to quote two cases from my own practice. In one there was optic neuritis as the result of chronic lead poisoning. In view of the rare occurrence of the anatomical changes which the fundus of the eye presented I requested the assistance of my colleague Dr. Alexander and am indebted to him for the great kindness with which he has carefully examined and described the optical condition.

The patient, aged forty-five, presented himself in 1882. In the course of his occupation for many years as a type-founder he had repeatedly suffered from violent lead colic together with

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<sup>1</sup> Hartung, Bericht ü. d. Bäder zu Aachen 1858, 59, 60. (Abdruck aus der Preuss. Mediz. Zeitung.)

<sup>2</sup> A. Reumont, Die Thermen von Aachen und Burtscheid, 1872.

severe obstipation in consequence of which he had been frequently an inmate of the Berlin hospitals. Nevertheless he was able to continue his work uninterruptedly until the summer of 1881; about this time asthenopic troubles occurred which were considered by the physicians whom he consulted on that account as a weakness of accommodation corresponding to the age of the patient, however, the convex glasses then ordered had not the desired effect so that the patient thenceforward was much hindered in his work. In the winter of 1881—1882 an especially severe attack of lead colic took place; this was accompanied by very severe pain in the head and vomiting, the patient also suffered for some days from diplopia. From that time his capability for work diminished in a striking manner and his eyes lost more and more power of vision; at times the objects which he perceived with the right eye seemed to be enveloped in a mist; gradually a similar state of things developed in the left eye. With this history the patient came here in the summer of 1882.

He was a great haggard man with a leaden looking countenance and a marked absence of fat, the emaciation showed itself most distinctly on the dorsal aspect of both fore-arms; there was a bluish-gray seam on the gums and the teeth were of a dirty colour. He had constipation, severe headache and loss of appetite.—Diplopia could not be demonstrated in the eyes, the general muscular functions were good, the pupils were dilated, but reacted normally in all directions. Vision on the right side was only 17/200, with + 2 he could read only a few words of Jæger-type No. 7; on the left side the sight was 17/40 with the same convex lens he could read Jaeger No. 2. The peripheral field of vision was concentrically contracted chiefly on the outside; his power of distinguishing colours was lost in the case of green, uncertain for red, and retained for yellow and blue, quantitatively his perception of colour and light appeared to be normal.

Ophthalmoscopic condition: on the right side: the contour of the papilla enlarged, its middle portion showed some atrophic changes, the vessels as they issued from the central canal, were indistinct and

covered with some exudation. The cloudiness extended thence over the tissue of the retina on which there were also some punctate hæmorrhages and exudation; arterics normal, veins somewhat dilated, both are free from tortuosity, the latter show a very strongly marked projecting central striation. On the left side the inflammatory signs are still more distinct, the exudation is more abundant on the papilla as well as on the retina than on the right side, the hæmorrhages also are more numerous. At the same time there are yet no signs of atrophy of the optic nerve to be noticed.

The case was evidently one of bi-lateral optic neuritis probably due to the development of a hyperæmia of the cerebral cortex to which the severe attack in the winter of 1881—82 is attributable and not to the direct influence of the lead on the optic nerve-substance.

The patient was treated by means of sulphur baths, iodide of potash in the thermal water and occasional doses of Carlsbad salt. The atrophy on the right side did not increase, but improved so much that the vision became 17/70. On the left side two venesections were performed, here the inflammatory symptoms completely subsided so that the sight became normal and complete sharpness of vision was attained. Further details of this case are wanting.

Second case. R. aged 64 of Berlin, had been a lead worker for thirty years, had suffered four mild attacks of lead colic with slight constipation. He came here for treatment in the middle of September 1887 on account of violent pains and feeling of spasm in the muscles of the upper arm, especially on movement and effort. The physical power of the arm as shown by the dynamometer, had suffered considerably and the extensor muscles were much wasted. His powerful legs and the sides of his body were the seat of violent neuralgic pains. Walking was possible only for a quarter of an hour on account of his becoming rapidly fatigued. Defæcation is at present pretty regular, the urine shows no albumen. There is a narrow seam of lead on the gums. The



complaints of a feeling of oppression in the chest, the unequal, irregular pulse, the want of perfect purity in the aortic sound suggests the possibility of a slight chronic myocarditis resulting from atheroma of the coronary arteries.

The patient took a sulphur bath of half an hour at 28° R. and drank from 800—1000 gr. of the sulphur water daily.

After twenty days the pains and spasms in the muscles had already disappeared, the feeling of numbness had given place to a normal condition so that a great impetus was given to the index of the dynamometer.

The patient left Aachen after twenty-five days of treatment very pleased with the result which shows how complete an influence is exerted in slight cases by the thermal treatment alone.

Third case. I am indebted for this case to the kindness of my colleague Dr. G. Mayer.—On the 9<sup>th</sup> August 1877 a gentleman aged 70 came here from the neighbouring part of Belgium to the bath-cure. His physician had diagnosed muscular atrophy, especially of the arm which was attributed to a cold caught whilst hunting.

The extensor muscles of the arms are atrophied, those the right side of a greater extent so that the hand remains closed. The fingers moreover cannot be shut so that writing is impossible. The supinators do not act. The extensors of the upper arm, the muscles of the shoulders and of the back are also impaired. The right leg is also weak and on walking very soon becomes tired.

The appearances in this case so strongly suggested chronic lead poisoning that a search was made for the metal, but at first without result. The treatment, which lasted a month, consisted of alternate thermal- and douche-baths and daily drinking of a litre of the sulphur water.

9. 8. 1878 the patient returned. The winter had been better than the previous one, nevertheless the weakness in the arm increased so that it was very difficult for him to lift the right arm to the horizontal position. The hands and fingers still remain in the old bent condition. The electrical reactions of the extensor

muscles and the electric sensibility are much reduced. In the beginning of summer vomiting occurred, which was followed in about two hours by almost complete loss of consciousness and impairment of vision. Since then vertigo and headache have been a continual source of torment.—As the prevailing paralysis and atrophy of the muscles was so pronounced lead poisoning was again thought of and finally a considerable quantity of lead was found in his snuff which had been made up in lead foil.

Electric treatment was now added to the daily baths and douches and the morning dose of Carlsbad salt in a large quantity of the sulphur water.

The patient remained here again a month and at the end of that time felt better.

He returned in 1879. The vertigo and headache had disappeared. The action of the supinators had improved. The other muscles of the arm had become much stronger than formerly, so that writing was again possible; however he soon became fatigued.

The treatment this time consisted of douches, for a month thermal baths, drinking of sulphur water and electricity.

He came back again in 1880. The electric treatment had been further carried out at home. He found himself very well, his general condition was very satisfactory, all head symptoms had disappeared. He now looks quite well and has gained considerably in weight. His hands are still somewhat flexed but they as well as the arms can be used in an almost normal manner. The electric excitability still remains somewhat depressed.

The patient had another month's treatment after which further details are wanting.





XIII.

DISEASES OF THE EYES.

BY

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**D**ISEASES of the eyes have only rarely received thorough consideration in balneological hand-books as well as in the special monographs of bath physicians, for instance in Helfft's otherwise very complete Hand-book of Balneology scarcely three pages are devoted to this subject. My special-colleague Hermann Pagenstecher alone has gone thoroughly into diseases of the eyes in his "Balneological Studies at Wiesbaden" published by Emil Pfeiffer and in an article which is well worth reading "Wiesbaden as a place of treatment for diseases of the eyes". He has treated in a clear and concise manner the indications and contra-indications of every bathing place for eye troubles.

I have responded to the invitation to contribute to a general work on Aachen's justly celebrated and much sought thermæ all the more willingly as I am thereby enabled to state of how great importance is the generally received opinion that eye diseases in very many, perhaps in most, cases stand in a pathological connection with diseases of the entire organism and that a result corresponding to the treatment is possible in the cases of the former only when due regard is paid to the general condition. The longer I am in practice the more I am convinced (and it must also be the experience of our native and foreign colleagues at the present time) that amongst the visitors sent here to our

thermæ we seldom find simple disease of the eye unconnected with disease of the general system as appears to have been the case formerly. At any rate in the former bath-books of Aachen I find occasional cases of eye disease quite distinct from any constitutional trouble.

There is not a small number of cases of constitutional anomalies complicated with eye troubles coming here for treatment. I have myself been able to collect from the numerous cases of eye disease which I have treated during twenty-three years practice in Aachen 1385 cases for a large monograph which were solely due to general syphilis.<sup>1</sup> I do not think I shall be mistaken if I state that amongst the numerous persons who on account of rheumatism, gout or syphilis (those three constitutional diseases of the first rank) come to the health-bearing thermæ of Aachen every year there are certainly from three to five per cent who are afflicted with more or less severe disease of the eyes.

With special regard to the diseases of the eye which occur in consequence of rheumatism Förster (in the seventh volume of Græfe & Sæmisch's "Sammelwerke"), when treating of the relation of rheumatism and gout to the eyes, very properly points out that the connection between a definite eye disease and rheumatism is very difficult to be proved, even when it is recognised on all sides that f. i. diseases of the uvea, especially of the iris, occur frequently in connection with rheumatic pains in the knees. But to decide whether the iritis arises directly as the result of cold, or whether the latter has caused the general disease which we call rheumatism and the iritis is then to be considered as a secondary symptom, must be difficult in most cases, if not impossible. Further, we must also frequently look on paralyses of the orbital muscles as resulting from cold and not from constitutional rheumatism and this more readily when through an ascertainable cause of cold a hyperæmia of the meninges has arisen in consequence of which these paralyses present themselves as symptoms. How-

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<sup>1</sup> Syphilis und Auge, von Dr. Alexander bei Fr. Bergmann in Wiesbaden.

ever may that be, we at any rate meet here with many cases of eye disease in which cold can be demonstrated as the cause and in spite of the habit at present so prevalent of laying everything at the door of syphilis one finds only too often that the latter cannot be considered as the ætiological factor. I may therefore be permitted to first refer briefly to the affections of the eyes which occur amongst patients here who have not had a trace of syphilis and in whom these diseases are to be considered as rheumatic and are to be treated accordingly.

The diseases of the sclerotic (scleritis) and of the cornea (keratitis) are not seen here very frequently, nevertheless, their rheumatic origin in many cases cannot be denied. While it is well known that scleritis occurs more frequently in women who suffer from uterine troubles I have repeatedly met with it in men as the result of an ascertainable and very severe exposure to cold, as for instance, getting wet through. The deep, bluish red colour of the sclerotic with those vesicular elevations which are especially localised at the points of insertion of the orbital muscles offer no difficulty as regards diagnosis. A repeated residence in Aachen and the use of our thermæ have had a decidedly beneficial and abbreviating effect on the course of the disease in some cases which have come under my observation.—A disease of the cornea known as *keratitis profunda* or *keratitis parenchymatosa* occurs far more frequently in connection with joint diseases. If it cannot be denied that this complication is very often the expression of a hereditary syphilitic tendency, yet it should not be forgotten that in many cases such a hereditary tendency cannot be proved. If we do not look on all cases of enlarged cervical or inguinal glands as the expression of a hereditary syphilitic diathesis transmitted from the parents, in like manner the unprejudiced observer cannot deny the fact that in the course of chronic rheumatism inflammation of the cornea occurs in connection with the joint disease. Spencer Watson has seen *keratitis parenchymatosa* develop during acute rheumatism on four occasions. The dull grey aspect of the cornea into which more or less distinct



and freely anastomosing vessels proceed from the margin will enable the diagnosis to be made with as little difficulty as in the preceding affection.

Rheumatic diseases of the uveal tract occur much more frequently than those of the sclerotic and cornea. The most important is chronic iritis and irido-choroiditis or cyclitis, which occurs in the course of chronic rheumatism, as well as in consequence of exposure to cold.

When discussing syphilitic diseases of the eye we shall find that certainly more than fifty per cent of all cases of iritis are due to syphilis; nevertheless we must seek other causes to which the first attack of iritis is to be referred since in from thirty to forty per cent of the total cases symptoms of general syphilis are entirely absent. We therefore learn from patients that in consequence of a hunt, a journey in an open carriage or by the open window of a train, after a severe wetting, &c. inflammation of the iris occurred which, however, soon subsided, but has always recurred and tormented them with the dreadful fear of total blindness. More or less discoloration of the iris with synechiæ between it and the lens capsule are the signs of chronic iritis with which patients usually present themselves here for treatment. Symptoms of acute inflammation are seldom observed, on the other hand we sometimes see some deposit on the posterior surface of the cornea precipitated from a previously turbid condition of the aqueous humour of the anterior chamber. There is also a marked impairment of vision. I have frequently seen such cases in which an iridectomy had been performed with a view to prevent complete occlusion or dilatation of the pupil. Though the treatment of chronic iritis is at present difficult and though therapeutics can do but little to protect the patient against a recurrence of the disease, nevertheless with contemporary local treatment of the diseased organ I have seen repeated good results from the use of our sulphur thermæ. The prognosis is still more unfavourable in cases in which the ciliary body or sclerotic is involved. There is then a dirty grey colour of the sclerotic, a shallow anterior chamber,

bulging forward of the iris on account of the pressure of the exudation behind it, which, together with complete synechia of the iris and lens capsule and a still greater impairment of vision are the unmistakeable signs of a deep seated disease of the organ which proceeding from the uvea has destroyed successively the other structures and may eventually lead to its total destruction. Such cases may also be due to cold and, if the state of the circulation in the iris is improved by a timely iridectomy and a communication is established between the anterior and the posterior chambers, our baths exercise a favourable influence in combination with other resolvent and alterative treatment.

Diseases of the choroid and retina which owe their origin to cold or to rheumatic causes and would therefore offer a suitable field for our thermal treatment, have not presented themselves here, at any rate to me though I have occasionally met with accounts of rheumatic retinitis in the old bath reports of Aachen, nevertheless neither the pathogenesis nor the name of the disease appears to me to be indisputable.

Since these accounts refer to preophthalmoscopic times, in which a view of the interior of the eye was not yet possible, diseases of that portion of the organ could not be diagnosed.—I do not, therefore, object to blot out the so-called rheumatic choroiditis and retinitis from the list of those eye affections the course of which would be influenced by a course of treatment at Aachen. On the other hand I have sometimes seen disease of the termination of the optic nerve, papillitis or neuritis optica which was due to a rheumatic swelling of the periosteum of the interior of the optic foramen. Marked depression of the power of central vision, pain on movement of the bulb as well as on pressing it backwards into the orbit together with ophthalmoscopic sign of inflammation in the optic papilla all point distinctly to an inflammation in the posterior part of the orbit, that is to say in the optic foramen, which by pressing on the sheath of the optic nerve has consequently involved the nerve substance itself. I recollect two ladies whom I treated for this affection of the optic

nerve and whom I have seen cured by energetic sweating and bath treatment. If the swelling and inflammation of the periost passes backwards through the optic foramen and extends to the base of the skull, there will then, besides the symptoms of inflammation of the optic nerve, be also those of paralysis which is especially marked in the region supplied by the oculomotor, abducens, trochlearis and also the facial and trigeminal nerves. As we shall see later on, whilst in paralyses of the ocular muscles of syphilitic origin we have to distinguish between peripheral and intercranial paralysis and in the latter case between a basal and cerebral site of the lesion, in rheumatic paralyses of the eye muscles only the peripheral branches and the trunks of the nerves which rest on the base of the skull are exposed to injury, for there can scarcely be a cerebral paralysis of rheumatic origin. A basal periostitis accordingly involves the entire oculomotor, or abducens and trochlear nerves, as well as the optic, separately or in combination with one another. Since the nerve trunks resting on the base of the skull contain co-related fibres which deviate from each other in the interior of the brain substance, in this way, for instance, the entire oculomotor together with the twigs supplying the muscles of both pupils (the sphincter pupillæ and the tensor choroideæ) may also be paralysed by rheumatic thickening of the basal periosteum or by basal exsudation due to meningitis; in like manner the other cerebral nerves may be affected in their entire distribution by a disease of rheumatic origin situated at the base of the skull. If, on the other hand, the periosteal swelling is situated in the cavity of the orbit where the nerves have already entered into the substance of the muscles, the paralysis may be limited to single twigs of the affected nerves; in the latter case the disease will be chiefly of a myopathic nature, that is to say, it is not the nerve, or the neurilemma, but the intermuscular connective tissue and the muscle fibres which will be affected by the exposure to cold and will react, as we know from the peripheral muscles and those of the extremities, in the form of pareses and paralyses. Unfortunately in the cons-

ideration of paralytic conditions of the eye on anatomical grounds, we cannot test the reaction of the nerve and muscle substance to electric stimulation, which is so useful a means in other paralyses of distinguishing between those of peripheral and central origin. It is only in the case of the nerve yet to be considered, the facial, through a disturbance of the functions of which lagophthalmos arises, that we are enabled\* to make use of this reaction. All these paralyses of rheumatic origin are essentially improved and also cured by the treatment at our sulphur thermæ. I may refrain from entering into a detailed account since all the paralyses above referred are sufficiently well known to every physician and their diagnosis presents no difficulties.

Though the number of persons who visit our thermæ on account of gout increases from year to year, yet those eye troubles which can be brought into a causal relation to that disease occur only very seldom. That the deposit of urates may create a disposition to diseases of the sclerotic, the development of glaucoma &c. has been frequently recognised, but has never been proved. I have certainly had the opportunity of seeing and treating many cases of eye disease, especially affections of the sclerotic and cornea, in gouty persons without having been able in a single case to prove that these affections were to be considered as symptoms of gout. For this reason I do not enter into a further account of that disease, and I also omit any attempt to prove a connection between eye diseases and the large variety of skin affections which come here for treatment, eczema, psoriasis, prurigo, &c.; at any rate I have never been able to prove any such connection. Mooren has arrived at different results in his monograph "*Hauteinflüsse und Gesichtstörungen*". He considers the occurrence of interlamellar corneal abscesses and episcleral inflammatory formations in connection with pustular and ulcerous skin diseases as indisputable, and the same author states that there is a causal relation between other skin diseases and eye affections.

By far the largest contingent of the visitors to our thermæ



are affected with syphilis, the symptoms of which in the eye are of most frequent, almost daily occurrence in my practice at Aachen. In the work already referred to "Syphilis und Auge" I have treated in detail the syphilitic diseases of the eye and I must refer those who are interested in such affections to it and to the special works of Förster, Mauthner, Schubert and others. I may here be permitted to say a few words on a subject which is of importance as regards the diseased organ as well as of interest and value to the pathologist and therapist.—The first work of any value on syphilitic eye diseases, and indeed on syphilitic iritis was published beginning of this century by Joh. Adam Schmidt. But it was reserved for the second half of our century to bring about a complete transformation in the teaching of general syphilis as well as in that of the eye arising from it. Whilst up to that time the ætiological principle was considered sufficient for the classification of eye affections, since the epoch making labors of the immortal Albrecht v. Græfe the pathologico-anatomical principle became the foundation of the study of these diseases and sober, unprejudiced observation succeeded in establishing definite groups of disease forms where previously (especially in the days of Boërhavé's school), chemico-medical and iatrophysical theories had led to the acceptance of specific diatheses, rheumatic, gouty catarrhal &c.

With regard to syphilis, we know at the present time that it spares no portion of the eye, with the single exception of the crystalline lens, even this, as Michel thinks, may be attacked. Finally also, as Pflüger declared at the last International Ophthalmological Congress at Heidelberg, syphilis may be considered as the ætiological factor in glaucoma, both of youth and middle age as well as in congenital hydrophthalmus. Up to the present, statistics have not yielded any certain evidence of the percentage of syphilitic eye diseases as compared with that of other syphilitic symptoms and this evidence cannot be expected since the first point to be considered in this connection, namely to what extent does syphilis prevail over any definite geographical region, cannot be determined. Our knowledge is more certain regarding the

percentage relation of syphilitic eye diseases to the idiopathic, non-syphilitic eye affections. From the literature accessible to me I have been able to prove that in a total of 138,000 cases of eye disease 2998, that is 2.16% were of syphilitic origin. I have myself, in about 50,000 eye cases treated during twenty-three years, found 1385, or 2.76% syphilitic. These were distributed as follows:

|                                    | No. of cases | percent |
|------------------------------------|--------------|---------|
| Lids & conjunctiva                 | 8 or         | 0.47    |
| Bones & Lachrymal organs           | 35 "         | 2.52    |
| Sclerotic " "                      | 3 "          | 0.13    |
| External muscles "                 | 146 "        | 10.54   |
| Internal " " (pupil)               | 59 "         | 4.26    |
| Cornea " "                         | 75 "         | 4.48    |
| Uvea (iris, corp. cil. & choroid.) | 331 "        | 23.97   |
| Retina " " " "                     | 107 "        | 7.72    |
| Optic Nerve " " " "                | 568 "        | 40.93   |
| Facial & trigeminal nerves "       | 14 "         | 1.00    |
| Hereditary diseases "              | 39 "         | 2.81    |
| <hr/>                              |              |         |
| Altogether 1385 or 99.93%          |              |         |

On the eye-lids we find, besides the initial sclerosis, both gummatous and rupial ulcers. The causes of the initial sclerosis in this situation are certainly of manifold nature: through infection from washing the linen of syphilitic patients (Hamande), through the bad habit which prevails especially in the south of France, of removing foreign bodies from the conjunctival sac with the tongue (Beck and others), finally cases of accidental injury to the lids which subsequently become infected. Of the manifestations of general syphilis we encounter all those conditions, from the condylomatous to the gummatous stages, which are present on the general surface of the body: Roseola, acne, gummata and the gummatous formations arising from them, as well as, finally, the rupial ulcer; of the last there have been only four cases reported in the special literature, two by Hock, one by Heyfelder and one by myself.—Syphilitic swelling of the tarsus is only occasionally met with in an acute—though somewhat more frequently in a chronic form; it occurs as a monstrous thickening of the lid,

which has exactly the extent and outline of the corresponding tarsal cartilage and which reaches from the edge of the lid to the margin of the orbit and from the external canthus to the inner angle of the eye; the simultaneous presence of other evidences of syphilis as well as the favourable influence of anti-syphilitic treatment confirm the diagnosis of tarsitis syphilitica. On the whole in my monograph from the literature of this subject I have collected 17 cases occurring here to which are to be added 2 other cases observed by me. As regards the conjunctiva, according to Lang, an intense conjunctival catarrh frequently occurs in syphilitic persons. Goldzieher and Sattler also describe a true conjunctivitis syphilitica which closely resembles trachomatous inflammation of the conjunctiva and yields only to anti-syphilitic treatment; it may be, as Goldzieher says with reference to this, that the tissue layer between the conjunctival epithelium and the tarsus, the adenoid layer, is histologically but a species of fan-shaped lymph-gland, which like the rest of the glandular system may become affected by syphilis. I have collected 37 cases of primary sore; the hard chancre in most of the cases here was due to an extension of the ulceration from the skin of the lid over its free border. On the other hand the soft chancre appears to be very rare; I can only find one case mentioned by Deprès and described by Sichel fils. The following are to be mentioned as manifestations of general syphilis on the mucous membrane of the eye: giant-papules and, especially, true gummatous tumours of the conjunctiva, which are either independent affections or may lead to the formation of a gummatous tumour; in the latter case it is not always easy to distinguish whether it is a primary affection or a symptom of general syphilis. I have myself seen but one case of this kind, which is also mentioned in my monograph, together with the 37 cases from other authors.

In diseases of the orbit and lachrymal apparatus the bony frame-work plays an important part. Syphilitic periostitis and ostitis occur on the margin of the orbit as well as in its walls and by their products may occasion the severest injury to the

bulb. In the first place there is the pressure which the swollen periosteum of the orbital parietes may exercise on the optic nerve as well as on the nerves which supply the orbital muscles, whereby a complete interruption of conduction through all these nerves may arise. Moreover, I may mention the extension of the inflammation to the fatty tissue in the orbit and through this to the meninges; there is also the influence which the pus from a carious orbital bone may have on the veins as well as on the central organs. The diagnosis of syphilitic disease of the orbit is to be established according to the principles of general pathology; if the disease is promptly and energetically attacked the prognosis is good, but becomes much worse if, in consequence of unsuitable or too temporising treatment those changes take place to which I have already briefly referred.—The lachrymal apparatus becomes affected only by the extension of the disease from neighbouring organs; affections of the conjunctiva may lead to swelling of the mucous membrane of the lachrymal passages and periostitis of neighbouring bones may give rise to destructive processes in the bony portions of the lachrymal ducts. Epiphora, stricture, carious and necrotic destruction of the bony parietes may come under observation as the result of idiopathic diseases as well as of those which are syphilitic.—Though Förster in his work already mentioned declares that the lachrymal gland enjoys immunity from syphilis the correctness of this opinion is contradicted by a number of cases in which syphilitic tumours of the lachrymal gland have been proved, and also in the cases reported by Tavignot, Streatfield, Adler, Albini and myself.

Although in the older text-books the dependence of diseases of the cornea and sclerotic on syphilis is still denied, nevertheless in recent times the occurrence of keratitis and scleritis syphilitica has been indubitably proved. I have myself found disease of the cornea in 76 patients, or 5.48% of the total number of cases of syphilitic affections of the eyes. The most frequent form is keratitis parenchymatosa, or diffuse interstitial keratitis which may be observed both in hereditary and acquired syphilis and



which is characterised by a cloudiness in the deeper layers of the corneal tissue which is not evenly distributed, but consists of clear-grey, diffuse spots which generally cover the entire area of the cornea and are frequently penetrated by anastomosing vessels. The accompanying inflammatory symptoms are usually only slightly marked, however they increase in intensity the more the iris is drawn into sympathy with the process. The prognosis as regards this affection in itself is not by any means bad, nevertheless the sight may be seriously impaired through the frequently persistent cloudiness of the cornea as well as by the manifold alterations in the curvature of the surface of the cornea resulting from the softening of its tissue. Keratitis punctata represents another form of syphilitic disease of the cornea. I do not, however, as I find some authors do, understand by this term that form in which little punctate deposits are precipitated on the posterior surface of the cornea (Descemet's membrane) from the clouded aqueous humour; this form I will describe further on as iritis parenchymatosa or as iritis serosa. On the other hand a true keratitis punctata may occur in syphilitic persons: it is that form first described by Mauthner, which becomes apparent as circumscribed grey spots of the size of a pin's head in the substantia propria of the cornea between which the corneal tissue remains intact and the iris is never sympathetically inflamed. More frequently, however, than this rare Mauthner's keratitis punctata is a second form which occurs frequently in the later stages of syphilis and especially in connection with diseases of the bony framework. In this form there are no coalescing spots as in keratitis parenchymatosa, on the contrary they are circumscribed, standing alone, the surrounding tissue is likewise cloudy and the iris is almost always involved. There are only a few cases of true gummata of the cornea described, as by Denarie, Magni. I have not yet met with a case of gumma of the cornea.—The syphilitic diseases of the sclerotic are even rarer than those of the cornea, nevertheless they have been seen and described by trustworthy authors such as Arlt, Jacobson, Galezowski and Higgens

and I have myself seen two cases of scleritis syphilitica. Gummata of the sclerotic, however, have been more frequently described, though it cannot be denied that in many cases the sclerotic is affected in a secondary manner by gummata of the iris or ciliary body.

The uvea is of all the parts of the eye the most frequently affected by syphilis and that both in the early and condylomatous stages, where its products are of an irritative or hyperplastic nature, and also in the later, gummatous stages in which the hetero-plastic products of Virchow usually exercise their destructive powers. Diseases of the iris occur far more frequently in syphilitic than in non-syphilitic persons; whilst in the latter only 0.04% were attacked by iritis in the former class there were from 3 to 5%. Moreover as regards the per-centage relation of syphilitic iritis to disease arising from other causes, all authors are agreed that more than half of all cases of iritis are of a syphilitic nature; I have myself found that amongst the cases of iritis seen by me more than 60% were syphilitic. If these figures only prove that of two cases of iritis one is probably syphilitic, there results from this for the practical physician the imperative obligation to seek for syphilis as the possible cause of every case of iritis, and not to allow any consideration of position or sex to induce him to abstain from a minute investigation of the general condition.—Simple or plastic syphilitic iritis, according to the investigations of almost all authors, belongs exclusively to the early stage of the constitutional disease and has been observed even during the existence of the initial sclerosis. The disease presents itself in exactly the same manner as the non-syphilitic, or genuine iritis, and has like it an acute, sub-acute and finally a chronic course. This is not the place to enter into a detailed account of the onset, course and sequelæ of syphilitic plastic iritis, which, as already stated, differs in nothing from the idiopathic affection; I must therefore refer the reader to the numerous text-books and monographs on this subject. I have myself in my monograph fully discussed this frequent, and important disease of the most sensitive portion of

the eye.—Though in the disease just mentioned we are not in a position to assert the previous occurrence of syphilis from the presence of plastic iritis, we can do so with certainty in another disease of the same class: iritis gummosa. This is not so rare as many authors appear to think: amongst 414 cases which I have collected from Schmidt, Knapp, Coccius, Schröder and Widder I find iritis gummosa 74 times, or in 17.8% of the entire number. There would therefore seem to be still considerable confusion as to what we are to understand by iritis gummosa. For my part I regard iritis gummosa as a collective term which includes not only every iritis characterised by partial swelling of the tissue, but also a nodular form which occurs in the early, or condylomatous, stage of syphilis as distinguished from a gummatous form belonging to the later, or gummatous stage. The nodules of the early stage correspond closely to the papules on the general skin and mucous membranes and show themselves both on the margin of the pupil and in the tissue of the inflamed and swollen iris, usually in a multiple form on account of which I propose to call this affection iritis papulosa; the second form, the true iritis gummosa, which belongs to the later period, on the contrary shows only a single large gumma in the region of the ciliary ligament which is usually isolated and without any inflammatory symptoms. Finally, both these forms have a different course and react in a different manner to mercury. Whilst the papules of iritis papulosa disappear under the influence of mercury without leaving a trace or even a stain on the iris, the second form is unfavourably influenced by the metal, the neoplasm undergoes caseous degeneration beginning at the centre and disappears, but leaves a stain on the iris. I have treated 62 cases of iritis papulosa, but only 5 of the gummatous form. In syphilitic plastic iritis as in iritis papulosa the fluid in the anterior chamber is usually clouded, from this cloudy condition of the aqueous humour little particles are precipitated on the posterior surface of the cornea and give rise to that condition which some authors erroneously call keratitis punctata and others describe as iritis serosa.

I see no reason why we should not include these cases simply under the head of plastic iritis and reserve the term *iritis serosa*, not for that process in which a peculiar exudation attended with new formation is thrown down from the iris, but for that in which there is cloudy swelling of the iris tissue with sluggish movements of the pupil and a deposit on Descemet's membrane resulting therefrom. In 1884 I published in Hirschberg's *Centralblatt* one of those extremely rare cases of true serous iritis which passed repeatedly from one eye to the other and was moreover complicated with syphilitic varicella.—Besides these deposits from the clouded fluid in the anterior chamber, *iritis syphilitica* throws down other deposits from the aqueous humour. Mixtures of blood and pus are only seldom observed in this disease and usually accompany those severe diseases of the uveal tract which are known under the names of *irido-choroiditis* and *irido-cyclitis*. On the other hand Schmidt first called attention to a yellowish, fibrinous exudation in the anterior chamber which frequently assumed the appearance of a dislocated lens. This usually disappears in a few days and is in most cases to be referred to syphilis, though at times it has occurred in other forms of iritis, especially those of traumatic origin.

The ciliary body is affected only sympathetically through the extension to it of diseases from the iris and choroidea. In the course of an attack of *iritis syphilitica* when there is more or less complete posterior synechia, pain in the region of the ciliary body, abnormality of the contents of the anterior chamber and cloudiness of the vitreous humour we are compelled to diagnose a transition of the comparatively mild iritis into an *irido-cyclitis* or *irido-choroiditis* which permits us to give only a doubtful prognosis. Gummata of the ciliary body are likewise part of a general gummatous process; I can find only three cases of gummatous formations in the ciliary body reported in the literature of this subject: by Mauthner, Woinow and Alt.

If we find diffuse or conglomerate cloudiness of the vitreous humour without any other causes for such cloudiness being present,



such as a high degree of lengthening of the bulbar-axis through sclero-choroiditis posterior, or disturbances of the circulation as the result of disorders of menstruation or hæmorrhages, we may often enough refer it to as a syphilitic affection of the choroid. Moreover, though the exudative forms of choroiditis, *C. disseminata* and *C. areolaris* may not permit the diagnosis of syphilis, we are all the more justified in referring the disease to a syphilitic cause as soon as a combination of one of those forms of exudative choroiditis can be demonstrated in a patient who has previously been infected with syphilis. Rare forms of syphilitic choroiditis are gummatous choroiditis; another form in which a greenish white exsudation is localised in the region of the macula lutea; finally, a form which is included by Leber with a typical retinitis pigmentosa and in which an atrophic process proceeding from the periphery to the centre of the choroid can be demonstrated, whilst groups of pigment of various form and size are found on the æquator bulbi.

The syphilitic choroiditis κατ' ἐξοχὴν is diffuse syphilitic choroiditis so ably described by Förster, which by some authors as for instance Leber, was formerly included amongst the diseases of the external retinal layer. In this affection opacities in the posterior part of the vitreous humour surround as with a cloud the optic papilla whilst the periphery of the fundus is unveiled to the light; on the macula lutea a punctiform exudation can be recognised; there is moreover constant diminution of central vision, hemeralopia, micropsia, and metamorphopsia; all these symptoms together with zonular diminution of the field of vision present such a distinctive picture of the disease that the diagnosis cannot be difficult even to the inexperienced. Whilst the opacities in the vitreous humour, the simultaneous extension of the disease to the tissue of the iris, so often to be observed, as well as the diminution of the perception of light all plead for the localisation of the affection in the choroid; the micropsia and metamorphopsia, the zonular diminution of the field of vision are evidence rather of the implication of the retina so that the affection so briefly

sketched just now may be considered as marking the transition to the diseases of the retina.

The first to describe several cases of true syphilitic retinitis was Jacobson in the *Königsberger Jahrbücher* for 1859, this form was afterwards disputed and the cloudiness localised about the entrance of the optic nerve was attributed to a vitreous membrane extended in front of the papilla in the posterior segment of the eye, accordingly the disease termed retinitis by Jacobson was regarded as a choroiditis. Unprejudiced observation as well as pathological research, however, have proved that it is a true retinitis of the inner layers. Whether the ophthalmoscopically visible opacity signifies merely an inflammatory swelling of the retina or merely a diffuse exudation between the internal limiting membrane and the vitreous humour, has not yet been certainly proved. Oswald and Hirschberg in their latest published work bring syphilitic retinitis in relation with the vessels of the interior of the eye and consider that these like the arteries of the brain, which according to Heubner's researches may certainly become gummatous, may also be attacked by syphilis. It is however certain that the hæmorrhages occurring in round spots, which, though rare, are sometimes present in syphilitic retinitis, depend on endarteriitis as described by Haab as they entirely correspond to Heubner's disease of the cerebral vessels. Exudations into the retina are, perhaps, still rarer than hæmorrhages. They extend inwards along the course of the peripheral blood vessels. In from one to two years from the date of infection the retinitis, which occurs with its attendant photopsia, may lead to the gravest disturbances, and may cause even the annihilation of the power of vision. An energetic, judicious and purposeful course of treatment, continued for a long time may, however, preserve the sight entirely or in a great measure, though one must be always on one's guard against recurrence. The most frequent recurrence is seen in that affection of the retina still to be considered, central recurrent retinitis, which is always referable to syphilis and of which only very few cases are published in the

entire literature. It was first observed and described by von Græfe, I have seen it three times, and Reuss and Ewetzky once. The frequent and unexpectedly appearing recurrence (in one case there were 23 recurrences), and the localisation of the disease in the macula lutea are the two chief characteristics of this disease which is so rarely to be observed and so difficult to treat. In the cases observed by me recurrence took place with the appearances of purulent irido-choroiditis in the first instance, in the second as micropsia and metamorphopsia and in the third as zonular deficiency of the field of vision.

The diseases of the optic nerve which with greater or less probability can be referred to previous syphilis come to Aachen in an unusually large number; I have myself seen the optic nerve affected in 568 cases or 40.93% of the total number of syphilitic cases amongst my patients. The optic nerve may be attacked at its peripheral termination in the optic papilla, at its central termination in the brain, and also in its entire course either as an independent affection or as an extension from the surrounding structures. We have, therefore, to distinguish between those processes which take place in the optic papilla and which consequently give rise to visible ophthalmic changes and those in which the latter cannot be observed. In the first place we find in all severe retinal inflammations the signs of inflammatory swelling of the termination of the optic nerve. We have therefore a neuro-retinitis which may be traced ophthalmoscopically to the outermost limits of the fundus. We have also to distinguish this condition from a neuritis optica which is limited to the papilla and its immediate neighbourhood as well as from "choke-disc" and neuritis descendens. Though both processes owe their origin to different intra-cranial changes it is not always easy to distinguish clearly between them since there are transitions from one form to the other and both may be observed frequently even in the same eye. Whilst choke-disc occurs especially where there is an increasing cause of pressure in the interior of the skull whereby, according to the researches of Axel Key, Retzius, Manz

and others the cerebral fluid is pressed from the arachnoidal sac between the coverings of the optic nerve, thus giving rise to the symptoms of choke-disc at the peripheral termination of the nerve, optic neuritis on the other hand occurs, if an inflammatory process extends from the surrounding structures to the sheath of the optic nerve and from thence to the substance of the nerve itself. Now, syphilis deposits its products in and around the optic nerve in its entire course from its point of entrance into the eye to its central termination in the occipital lobe either in the form of circumscribed gummatous tumours or in that of gummatous changes in the interior of the blood-vessels especially of the basal arteries, or it may occur as gummatous inflammation and diffuse infiltration which may involve the meninges both of the convexity and base of the brain and also the substance of the brain itself. Choke-disc of both eyes is therefore evidence of a gumma limiting the extent of the intra-cranial space, the localisation of which on the convexity of the brain must be assumed if the patient has still symptoms of irritation, epileptiform convulsions, &c., the site, however, must be sought for at the base if other nerves in the neighbourhood of the optic nerve are affected. The second form which gives evidence of itself at the optic papilla is neuritis descendens which as perineuritis passes from the sheath of the nerve to the nerve substance itself and may give rise to interstitial neuritis, fatty degeneration of the nerve bundles, and deposition of granule cells with simultaneous atrophy of the nerve fibres. This form especially is to be referred to the diffuse process, or, perhaps, more frequently to Heubner's syphilitic disease of the vessels; since it is well known that the arteries at the base of the brain are attacked at the very beginning of the gummatous changes, and that the intercalary ganglions through which the optic nerve takes its course will also be involved; one therefore finds that these are atrophied or necrotic in consequence of the partial or complete cutting off of its presiding nutrient source. Finally, there is a case reported by Barbar in which gummata developed in the substance of the nerve itself. This is therefore



the first impulse to the perineuritis already mentioned and its further development as inflammation of the optic nerve, a neuritis which becomes evident in the papilla as neuritis descendens. The fluid which is pressed by increase of intra-cranial pressure between the sheath of the optic nerve and the latter may in some cases act as an exciter of inflammation in the nerve substance and may thereby add choke-disc to the symptoms of neuritis descendens. Again, a considerable meningeal exudation on the base which has attacked the optic nerve substance through the medium of a perineuritis and called forth a neuritis descendens may also compress the optic nerve so that to the existing symptoms of neuritis descendens that of choke-disc may be added, under these circumstances, therefore, we may have both these types of disease under observation at the same time.—Besides these two inflammatory processes in the optic nerve, which are visible ophthalmoscopically as neuritis, syphilis also calls forth the signs of atrophic degeneration in the papilla of the optic nerve. We here distinguish three forms of atrophy: 1. The so-called neuritic atrophy, which occurs as the final result of the two inflammatory processes so briefly sketched just now. 2. Cerebral atrophy. Here, as in those syphilitic processes to which I have already referred, which, however, have not yet become visible at the optic papilla, interference with the circulation and compression of the optic nerve substance may directly cause descending atrophy of the optic nerve. 3. The spinal form of atrophy of the optic nerve which often occurs as the earliest symptom of tabetic spinal disease. This is not the place to enter into the distinguishing ophthalmoscopic features of these atrophic processes, or to examine, in what forms of chronic myelitis, or under what conditions changes may take place in the optic nerves. That syphilis may play an important part in these affections is admitted by far the largest number of clinical physicians and authors, the foundation and explanation of this opinion is to be found in this collective work and have been stated in the most convincing manner by my colleagues Drs. Mayer and Goldstein.—Besides these diseases of the optic nerve which give

evidence of their existence at the optic papilla, syphilis also produces functional disturbances for which we cannot demonstrate any accompanying ophthalmoscopic changes. For instance disease of one optic tract, by the law of semi-decussation of the optic nerve, may lead to hemiopic limitation of the field of vision, whilst the disease of the optic nerve between the chiasma and the bulb must give rise to unilateral amblyopia or amaurosis. Finally, we have still to mention the rare occurrence of scintillating scotoma and hemianopsia fugax. These are to be explained by disturbances of the circulation in the optic tract which is itself due to gummatous changes in the vessel walls.

The nerves supplying the ocular muscles which specially interest us: the oculomotor, (supplying the rectus internus, rect. sup., rect. inf., obliq. inf., levat. palp. sup., tensor choroid. and sphincter pupillæ); the abducens (supplying the rectus externus); the trochlearis (the obliq. sup.); the facial (supplying the orbicularis and finally, the trigeminus, the sensory and trophic nerve of the eye, may be rendered incapable of conduction by either peripheral or central disease processes and syphilitic paralyses of the ocular muscles are accordingly of frequent occurrence. I have, myself, been able to prove syphilis in 205 out of 345 instances of paralysis of the orbital muscles, that is in 59.4%. These syphilitic paralyses belong to the later, gummatous stage of the disease and occur at the time when the brain and spinal cord are most frequently affected; the syphilitic products attack the nerves either directly leading to neuritis and perineuritis of the nerve trunks or they compress it and render it thereby incapable of conduction, or finally, they may destroy the ganglia of origin in those central portions of the brain which, through Heubner's disease of the vessels, have undergone necrotic destruction of their tissue.—In general if the cause of the disease in an ocular nerve has a peripheral or basal site the nerve becomes paralysed in its entire length, whilst a central situation of the cause leads only to partial paralysis; we have also to apprehend a basal site of the lesion if several orbital nerves are attacked by paralysis and finally

if to this is added a paralysis of the trigeminus. Where, however, there is continued headache, and those dazed or dreamlike conditions, epileptic or apoplectic attacks, alterations of feeling and intellect in a patient formerly infected with syphilis and combined with paralyses of individual ocular muscles, in such a case we are justified in assuming a central site for the cause of the disease. As regards central paralyses Græfe has recently called attention to the extremely small extent of the relation that can be established between the double forms and corresponding paralyses of the orbital muscles.—Tabetic changes in the spinal cord frequently precede paralyses of the orbital muscles, and these are characterised by their rapid and transient course; after some weeks, indeed even after a few days or hours the paralysis, as for instance the dilatation of the pupil, disappears, in a still shorter time another muscle or the pupil of the other eye will be attacked and the affection will again disappear as rapidly as before. Of all the orbital nerves the oculomotor is the most frequently attacked by syphilis both in its entire extent as well as in its single branches; the trunk of the nerve is affected usually at the base of the skull, in that three-sided space which is bounded laterally by the pedunculi cerebri, behind by the corpora albicantia and in front by the hypophysis cerebri, that space where, as, is well known, gummatous neoplasms are most frequently found; if the gumma is of only limited size it will affect only one oculomotor nerve, but if it is larger and fills the three sided space just mentioned both oculomotors become affected. If the gumma grows laterally and towards the front one or both optic tracts or the chiasma will inevitably share in the condition thus briefly sketched; finally if the neoplasm extends over the chiasma still further in front and involves one or both optic nerves, neuritis optica will then be observed, or the process, without any intermediate inflammatory stage will directly pass into cerebral atrophy of the optic nerve. If the gumma should be situated in the sinus cavernosus or in the superior orbital fissure, or in the orbit itself, besides total paralysis of the oculomotor, there will then be paralysis of the

abducens, trochlear, and trigeminus.—Partial paralyses, or paralysis of single twigs occur far more frequently than complete paralysis of all the muscles supplied by the oculomotor nerve. In the first place the levator palpebræ superioris is very frequently affected so that Sandras and Lancereaux from that fact alone think that the diagnosis of syphilis may be made; these paralyses of the lids occur also in diseases of the cerebral cortex and of the Pons and according to Landouzy, who has published 11 cases of this affection, they also occur in diseases of the contralateral portions of the parietal lobe and of the Gyrus angularis. Mauthner, however, considers that the isolated paralysis of the levator palpebræ superioris signifies that the site of the lesion is in the nuclei of the nerves. Most frequently, however, in syphilis both pupillary muscles (sphincter pupillæ and tensor choroideæ) are found paralysed under the form of ophthalmoplegia interna through diseases of the third ventricle, where, according to the researches of Völckers and Hensen the nuclei of origin for both nerves are to be sought. More than ten years ago I was in a position to call attention to the fact that unilateral pupil and accommodation paralyses

- (1) in by far the greatest number of cases is of a syphilitic nature;
- (2) that the paralysis is incurable;
- (3) that it often occurs as the fore-runner of psychical disturbances.

The attention which I have given to this point for a number of years as well as confirmations from many capable fellow workers and nerve pathologists have constantly tended to strengthen me in my view as to the correctness of this opinion. This disease first described by Hutchinson as ophthalmoplegia interna, is almost always isolated and scarcely ever combined with ophthalmoplegia externa, that is, with paralysis of the motor muscles of the eye ball. In spite of the fact that the nuclei of the latter nerves are in direct relation with those of the nerves supplying the muscles of the pupil, since they arise in the immediate neighbourhood of



the third ventricle from the grey matter of the aqueduct of Sylvius down as far as the fourth ventricle, nevertheless one rarely finds them paralysed at the same time as the internal nerves which govern the muscles of the pupil. Heubner explains this by the different distribution of the circulation in the third ventricle on the one hand as well as that in the aqueduct of Sylvius and the fourth ventricle on the other. Whilst the third ventricle is supplied by the *ramus communicans posterior*, the other portions of the base are nourished by branches from the superior cerebral artery and the inferior cerebellar. Lastly, I have yet to mention the combination of paralysis of the oculo-motor with contra-lateral paralysis of the extremities—a combination which points to a pathological process in the cerebral peduncle of the same side with the occurrence of the oculomotor paralysis. I have given in detail a case of this class in my monograph on the relation of eye diseases to syphilis already so frequently referred to, where I have also quoted similar cases by Oyon, Kahler and Pick, Find-eisen, Bristowe and others. The prognosis of oculomotor paralysis depending on syphilis is in general unfavourable since, as already stated, it must be attributed to changes in the nerve nuclei in the cerebrum and the prognosis of cerebral syphilitic affections cannot be called specially favourable.

Syphilitic paresis of the abducens is of rarer occurrence than oculomotor-paralysis depending on the same cause, nevertheless this nerve may be attacked and rendered incapable of conduction by gummatous processes anywhere in its course from the orbit to the posterior border of the Pons where the nerve issues from the brain. If the gummatous focus is situated in the interior of the Pons the facial nerve may be affected as well as the abducens and this condition may finally be accompanied by contra-lateral paralysis of the extremities. If the abducens-paralysis occurs accompanied by symptoms of irritation one must bear in mind the possible existence of a lesion of the cerebral cortex; probably in this case there are trophic disturbances in the region of the nerve nuclei or multiple foci which affect both the brain substance and

the nerves themselves. Paralyzes of the abducens occurring in the course of syphilitic tabes show, as in the case of tabetic oculomotor-paralyses, the same transient, quickly disappearing, but always recurring symptoms.

The fourth, or trochlear nerve, is very seldom diseased as the result of syphilis. This nerve may be paralysed by basilar gummatous meningitis or also by an exudation in the fissure between the corpora quadrigemina and splenium through which the pia mater enters the fourth ventricle. Trochlear paralyses which are found in the literature of this subject in connection with some non-syphilitic diseases of the pineal gland, have not been observed in connection with syphilis. According to the researches of Gudden and others, both trochlear nerves cross in the anterior medullary velum, therefore, in paralysis of one nerve the site of the lesion must be sought for in the cerebral hemisphere of the side opposite to that on which is the paralysed muscle.

Of the other cranial nerves which interest us here we have still to mention the facial and trigeminus. The facial may be attacked anywhere in its course from its point of exit from the Fallopian canal to the lower border of the pons or the upper extremity of the medulla oblongata where the nerve leaves the brain, or in its course from this point through the pons to its nuclei of origin. The facial nerve is only rarely attacked by syphilitic processes having a peripheral site, somewhat more frequently by those situated in the base of the skull, but most frequently by syphilitic processes localised in the cerebrum. I will only mention here that when the lesion is peripheral or basal facial paralysis is caused by gummatous, or periosteal inflammatory products, whilst with a cerebral site it owes its origin to foci of cerebral softening induced by Heubner's disease of the blood vessels. In syphilitic disease of the pons the facial and abducens will be affected on the side of the lesion, the extremities, on the other hand, will be paralysed on the opposite side; only in the case of Ballet was the facial paralysed on the same side as the extremities whilst there was on the other hand contra-lateral paralysis of the

abducens. Paralysis of the facial is evidenced by the well known lagophthalmus, or lagophthalmus paralyticus.

Finally, we find, and not very seldom, the trigeminal nerve affected by syphilis. There may be symptoms of neuralgia in one or all of its three divisions or there may be symptoms of paralysis. Changes in the periosteum in and about the orbit and in the base of the skull and especially exostoses on the clivus Blumenbachii, gummatous neoplasms and inflammation of the meninges of the brain, disease of the brain substance or the trunk of the nerve itself may in one case occasion the most violent *tic douloureux*, in another extensive anæsthesia and in the symptoms of keratitis neuroparalytica resulting therefrom which may eventually lead to total destruction of the eye. This is not the place to enter into a detailed account of the connection between keratitis neuroparalytica and paralysis of the fifth nerve, I will state merely that, while some authors attribute the ulceration of the cornea which presents such peculiar symptoms, to trophic disturbances, others consider it is of a traumatic nature. I have published four cases of this class in my monograph together with the cases of Henry (fifth and auditory nerves), Kœnigstein (paralysis of all the external muscles of the right eye and of the right fifth) as well as the cases of Anderson and Gunn, Genkin and others.

It has now been incontestably established by the experience of many years and of entire generations of physicians that the treatment at the Aachen thermal springs is attended by specially favourable results in those organic diseases which owe their origin to acquired syphilis. I can also affirm the same with regard to the syphilitic diseases of the eye of which so many of the most important, interesting and difficult cases have presented themselves to me personally in the course of my long experience of practice here. For the conditions under which these favourable therapeutical results can be attained here, the methods of using our explanation of their effects on internal organs and all other similar matters I refer the reader to the paper by my colleague Dr. Beissel in this work. I will only say in conclusion that the

treatment of eye diseases due to hereditary syphilis—of which I need mention here only irido-cyclitis and irido-choroiditis syphilitica and keratitis parenchymatosa—to me at least have not afforded such favourable results as those due to acquired syphilis.

As contra-indications for the use of the Aachen thermal waters I may mention acute inflammatory processes attended with violent symptoms, intra-ocular hæmorrhages and finally detachment of the retina, whilst I have no personal experience of the influence of our waters on the glaucomatous process called forth by gouty deposition of urates.









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